Index to Reading Matter, Page 54. Index to Advertisements, Pages 55 - 58.

The Metal Worker

A WEEKLY JOURNAL OF ROOFING, CORNICE, STOVE, TIN, PLUMBING, HEATING TRADES.

With which is Incorporated The Stove and Tin Trade Journal, the Sheet Metal Builder, and Metal.

VOL. LIII. NUMBER 2 | NEW YORK AND CHICAGO, JANUARY 13, 1900. | ONE DOLLAR A YEAR SINGLE COPIES, 5 CENTS.

IRON STONE STOVE LINING.

Fits any Stove.

Plastered in like mortar. *Gets as hard as brick.*

MY FACE ON EVERY BAG.

PRICES—$1.60 per doz. 10 lb. bags in 2 doz. lots. $1.00 per doz. 6 lb. bags in 3 doz. lots. ONE CENT per lb. in bulk in Barrel.

Address WILLIAM M. NEWTON, Albany, N. Y.

For Steam and Hot Water Heating.

You Want the Best—We Have It.

SEND FOR CATALOGUE AND INVESTIGATE FOR YOURSELF.

GORTON & LIDGERWOOD CO.,

Old Colony Bldg., CHICAGO. 96 Liberty St., NEW YORK.
77 Oliver St., BOSTON, Prudential Bldg., ATLANTA, GA.

GORTON "Side Feed" BOILERS

Roofing Tin SPECIAL NOTICE. Read page 71

Diamond Thimbles. S. CHENEY & SON, Manlius, N. Y.

Don't put off until to-morrow the range you should have bought yesterday. The quicker you get the EXCELSIOR RANGE the better you will be satisfied. All enterprising dealers sell it.
ISAAC A. SHEPPARD & CO. Manufacturers 8 Philadelphia, Pa. Also makers of the Paragon Furnace

SOME OF THE ADS

which we use in the newspapers of several cities are shown here.

This is the way we talk to customers about our Furnaces and Ranges.

They are good arguments for you to use if you have them in stock.

ISAAC A. SHEPPARD & CO.,

NEW YORK, PHILADELPHIA, BALTIMORE.

Makers also of Paragon Hot Water Circulators and Steam Generators.

THE PARAGON FURNACE doesn't have that awful coal appetite. All enterprising dealers sell it.
ISAAC A. SHEPPARD & CO. Manufacturers Philadelphia, Pa. Also makers of Excelsior 7 Ranges

Better change your jobber in galvanized iron, unless he is ours.

Apollo Iron and Steel Company, Pittsburgh.

Steel Baths,

Both *all steel* and *steel copper lined,* for sale at low prices, delivered to buyer's station.

E. S. WHEELER & CO.,

256 Water St., New Haven, Conn.

New York Store, 10-12 Cliff St.
New York Showroom, 160 Fifth Ave.
Boston Agency, 220 Devonshire St.

THE Struthers Iron and Steel Co.

STRUTHERS, OHIO

MANUFACTURERS OF THIS BRAND

UNIFORM-SOFT-SMOOTH CLEAR FINISH

CLOVER LEAF BRAND

STRUTHERS IRON & STEEL CO. STRUTHERS, OHIO.

PAGE 11

DIGHTON

No.	19.	20 in. pot,	$40.00	castings,	$8.00	casings.
"	21.	22 " "	48.00	"	9.00	"
"	23.	24 " "	60.00	"	11 50	"
"	25.	26 " "	70.00	"	14 00	"
"	28.	29 " "	100.00	"	7.00	"
"	30.	31 " "	125.00	"	17.00	"

CROSBY SPRING-SEAT GLOBE and ANGLE VALVES, IRON and BRASS.

All working parts renewable without taking the valve from piping. All parts interchangeable. Guaranteed not to leak at high pressure. Send for circular.

CROSBY STEAM GAGE & VALVE CO.,

BOSTON: 95 Oliver St. NEW YORK: 78 John St. CHICAGO: 21-23 W. Lake St.

GALVANIZED SHEETS.

We manufacture only the highest grade Galvanized and Black Sheets. Our Clover Leaf Galvanized Sheets are uniformly soft, well coated and no rough edges; especially adapted for cornice and eave trough work or where an extra soft sheet is required. *You cannot buy a better sheet.*

FOR SALE:

Cheap, **Complete Sturtevant Blowing and Heating System,** containing 3000 feet of heating surface.

KIELEY & MUELLER,

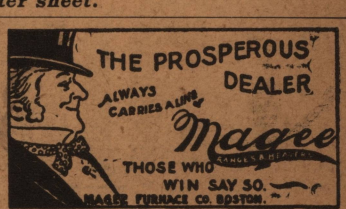
7 to 17 West 13th St., NEW YORK.

JENKINS AUTOMATIC AIR VALVES

with Drip-pipe Connections insure perfect circulation. You are not annoyed with escaping steam or dripping of water. They are stamped with our Trade-Mark.

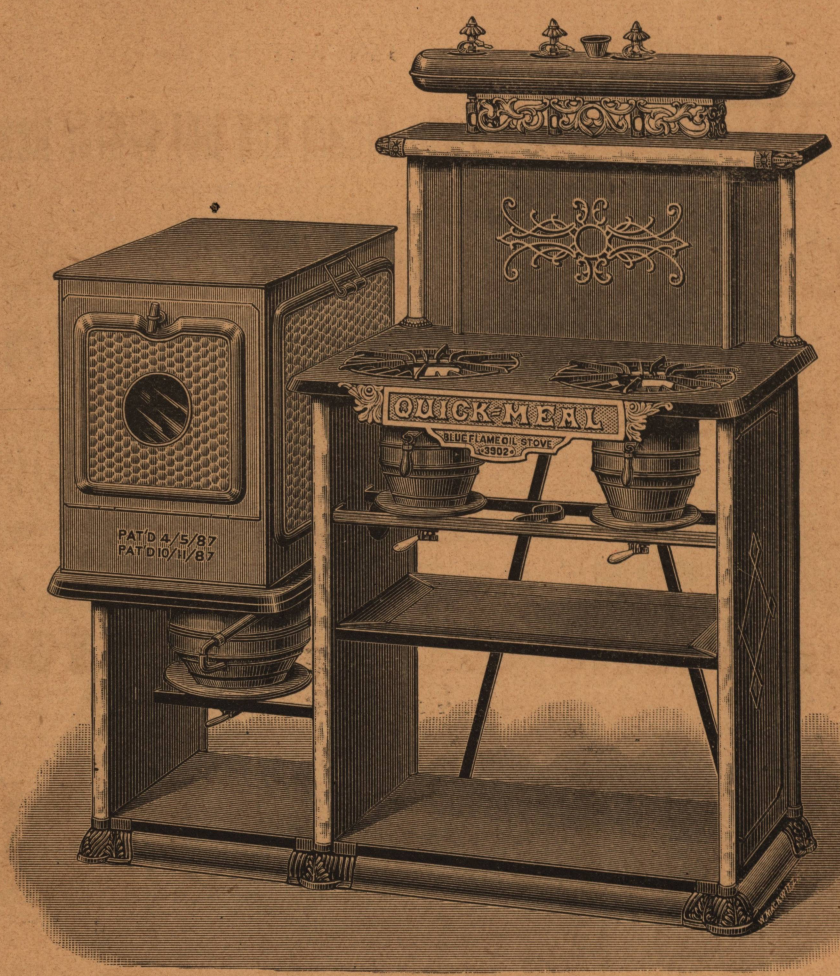
JENKINS BROTHERS,

New York, Boston, Chicago, Philadelphia



QUICK MEAL

"Wickless" Blue Flame Oil Stoves.



A Few Special Points of Superiority of "Quick Meal Wickless" Blue Flame Oil Stoves for 1900.

1. The "Quick Meal" Tank is composed of only **two pieces.** These two pieces are jointed together by a **single seam.** That single seam is **absolutely tight,** because it is made on a machine specially built to do that work only. **It is leak proof.**

2. The "Quick Meal' Valves have a **direct feed.** There are no small tubes through which the oil must pass before reaching the Burners, and there are no Ells to clog. The Oil flows from the Tank to the Burners **in a direct line.**

3. The "Quick Meal" Valves are simple in construction, they are easily adjusted, easily cleaned and easily removed and put back.

4. The "Quick Meal" Valves, not being connected to any intermediate pipes, but **going straight through the tank,** are substantial and strong in themselves, they strengthen and stiffen the Tank, and they do away with all pipes and fittings heretofore located between the Tank and the Stove and which parts have always been the weakest point about the stove.

5. The "Quick Meal" Valves are so located that an Oven, Washboiler or tall Vessel does not interfere with their operation; they are also out of the reach of children.

[To be continued in the next issues.]

"Quick Meal" Steel Ranges are "Quick Selling" Ranges; they are "Quick Satisfaction" Giving Ranges.

RINGEN STOVE Co. SAINT LOUIS

LARGEST MAKERS

OF

Warm Air Furnaces,

Combination Heaters,

Steam and Hot Water Heaters

AND

Acetylene Gas Generators

IN THE WORLD.

OUR NAME IS A

Guarantee of Excellence.

International Heater Co.,

UTICA, N. Y.

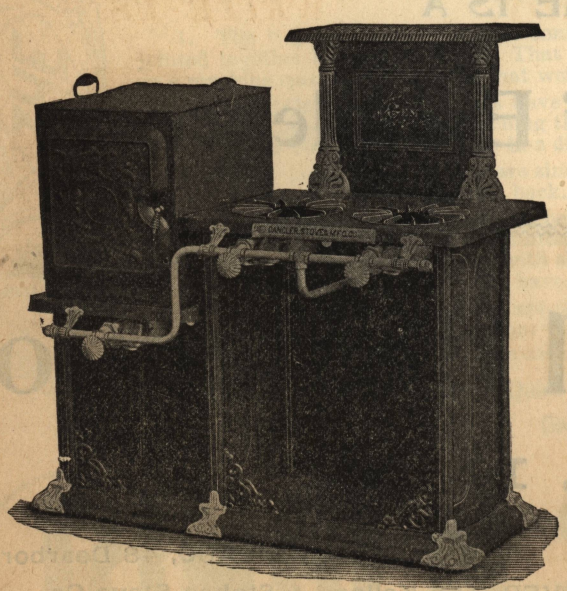
NEW YORK, 237 Water St.
BOSTON, 47 Union St.
CHICAGO, 48 Dearborn St.
DENVER, The Kellogg & Stokes Stove Co.

A MODEL PLANT.

While the announcement may be startling it is nevertheless true, that we have the largest, most convenient and best equipped works for this line of business in the world.

It may also seem startling to announce the fact that our lines of Gasoline Vapor and Evaporating Stoves, Blue Flame Wick and Wickless Oil Stoves and Gas Ranges, Stoves, etc., will have no equal in the market the coming season of 1900 for convenience, utility and attractiveness. Send at once for a catalog or catalogs and be convinced of what we have announced.

THE DANGLER STOVE & MFG. CO., Cleveland, Ohio, U. S. A.



1900

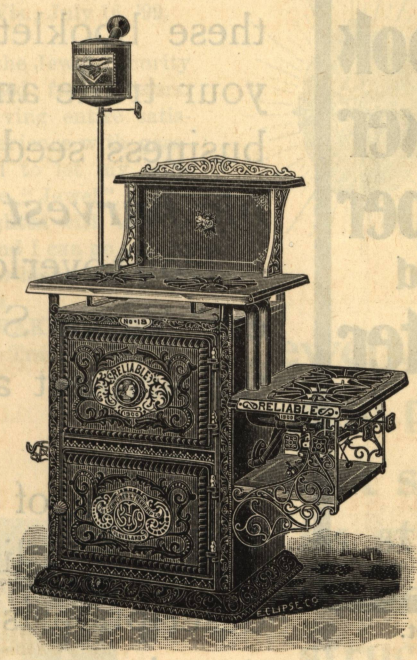
Our constant aim has always been to make

RELIABLE STOVES AND RANGES

The very best that skill and brains can produce

Our Facilities are Unequaled.

Our Plant the Largest and Best Equipped.



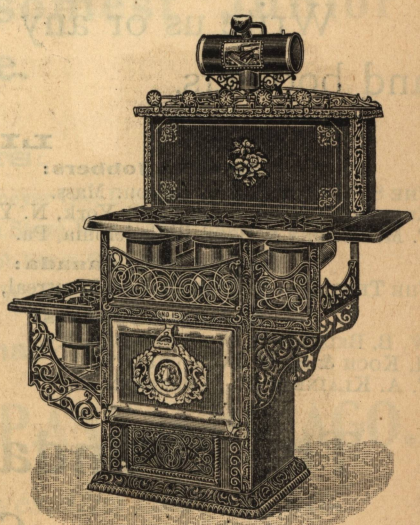
Our Materials the Very Best.

Our Machinery the Very Latest.

CATALOGUES NOW READY. *WRITE US.*

THE SCHNEIDER & TRENKAMP CO.

CLEVELAND and CHICAGO.



The "Standard" Wickless Blue Flame

For Coal Oil or Gasoline.

It's the best oil cook stove. **What more can we say?**

Title-page of Wickless Booklet.

Our illustrated booklet "How to Cook Quicker, Cheaper and Better" will convince your customers ***why it's the best.*** The booklets—as many as you can use—are yours for the asking. Our jobbers have them. Place these booklets in the hands of your trade and you are sowing business seeds that will yield a ***big harvest of profit.***

Don't overlook the "New Process" Vapor Stove for 1900. It's the simplest and safest gasoline stove.

Our line of Giant Burners and Junior Gasoline Stoves of every description is a beauty, and you can take your "pick," but don't wait.

Write us or any of the following jobbers for catalogues and booklets.

LIST OF JOBBERS.

Eastern Jobbers:
THE S. M HOWES CO., Boston, Mass.
EUGENE MUNSELL & CO., New York, N. Y.
F. M. BORDEN & BRO., Philadelphia, Pa.

Dominion of Canada:
THE THOS. DAVIDSON MFG. CO., Montreal, Que.

Southern Jobbers:
W. B. BELKNAP & CO., Louisville, Ky.
H. KOCH & SONS, Evansville, Ind.
F. A. KLAINE & CO., Cincinnati, O.

Central States:
COOK & VAN EVERA CO., Chicago, Ill.
TOWNLEY STOVE CO., Terre Haute, Ind.
MORLEY BROS., Saginaw, Mich.
F. TIEMANN STOVE & HARDWARE CO., St. Louis, Mo.

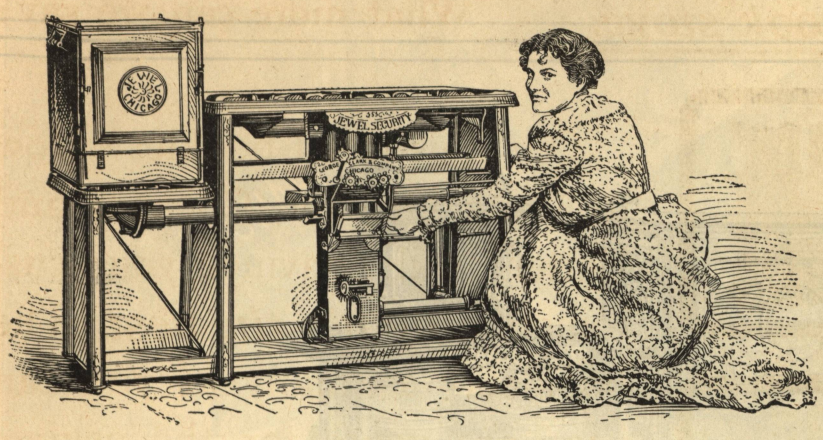
Western States:
HOLBROOK, MERRILL & STETSON, San Francisco, Cal.
FARWELL, OZMUN, KIRK & CO., St. Paul, Minn.
TOWNLEY METAL CO., Kansas City, Mo.
A. C. RAYMER, Omaha, Neb.

The Standard Lighting Company,

Cleveland, Ohio.

The Jewel Line for 1900.

Never Bigger, Never Better.



THIS IS THE WINNER. THE ONLY SAFE GASOLENE STOVE EVER MADE.

Stevens Point, Wis., July 16, '99.
GEO. M. CLARK & CO.,

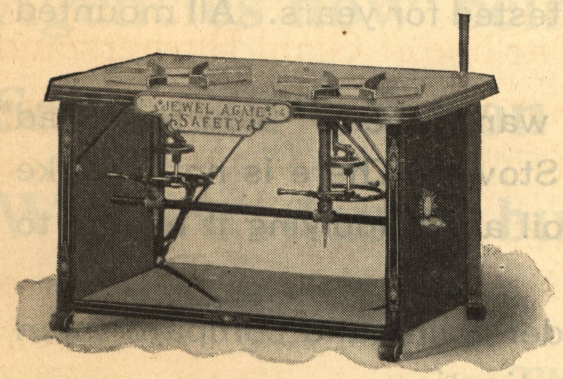
GENTLEMEN: In regard to the Jewel Security Gasolene Stove which I purchased from Messrs. Gross & Jacobs, will say it is giving entire satisfaction. I have not had any experience with gasolene stoves before, and was afraid to let my wife have one, but after examining the "Jewel" I concluded to try it. My wife is delighted with it, says it bakes and cooks to perfection, and I can go out on my trips without any fear of her being blown up during my absence. Resp'y yours,

GEO. T. WAKEFIELD,
Special Agent Travelers Ins. Co.

Jewel Juniors, all styles and prices.

Sheet steel construction, as stiff and strong as our old cast iron construction.

Handsomest Junior made.



WHOLESALE AGENTS:

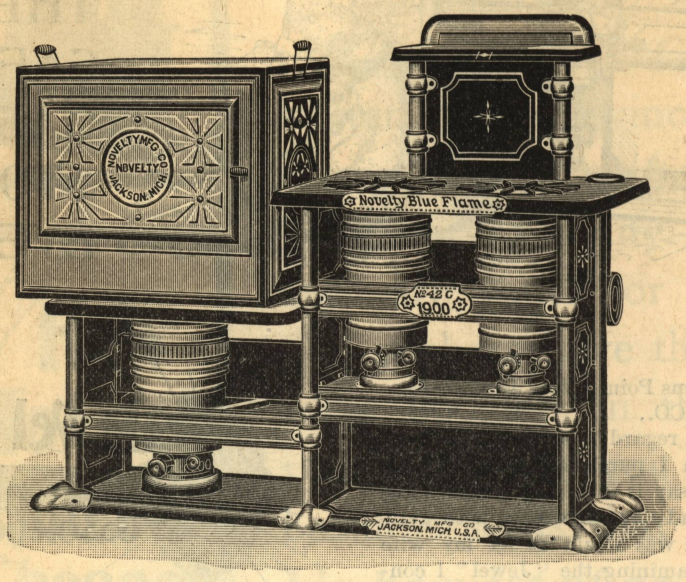
Great Western Stove Co., Leavenworth, Kans.; Omaha, Neb.; St. Paul, Minn.
W. W. Montague & Co., San Francisco and Los Angeles, Cal.
Stratton & Terstegge, Louisville, Ky.
H. Sandmeyer Co., Peoria, Ills.
Mt. Penn Stove Wks., Philadelphia, Pa.
B. C. Bibb Stove Co., Baltimore, Md.
Howard W. Peak, Ft. Worth, Tex.

Catalog is ready. Have you had one?

GEORGE M. CLARK AND COMPANY, CHICAGO.

Makers of Jewel Gasolene Stoves, Gas Stoves, Gas Heaters, Etc.

CABINET COOKS.



WE OFFER to the trade for 1900, the finest line of BLUE FLAME COOKING STOVES ever seen. These are not "Wickless Wonders." They are our Wick Blue Flame Stoves that have been tried and tested for years. All mounted in handsome cabinet form.

You want them. Your trade wants them. You have had bitter experience with Wickless Stoves. There is nothing like a pure cotton wick for drawing oil and supplying it evenly to a burner.

Samples are now ready. Order a line and compare them with others. They will bear investigation.

NOVELTY MANUFACTURING CO.

JACKSON, MICHIGAN, U. S. A.

Our New Cuts will be shown in next week's issue,

Agencies now being placed,

Salesmen now on the road, and

We are doing business at the old stand.

THE MONARCH STOVE & MFG. CO.,

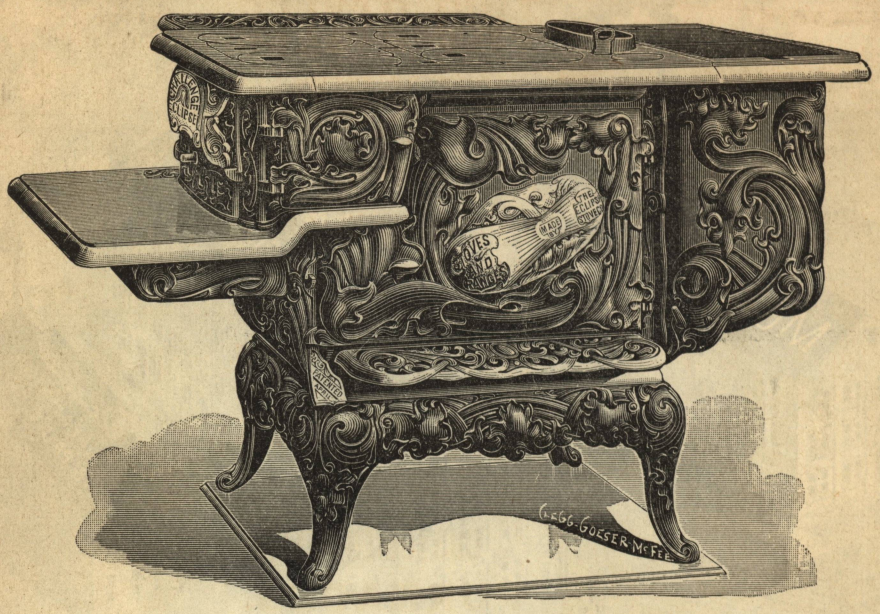
MANSFIELD, OHIO.

Branch Houses:

284-286 Pearl St., New York. 107 No. 2d St., Philadelphia. 203 Wood St., Pittsburg.
67 Lake St., Chicago. 191 Eagle St., St. Paul.

CHALLENGE ECLIPSE.

A LINE OF COAL AND WOOD COOKS AND RANGES.



Write for Catalogues and Discounts.

Every Stove Warranted.

THE ECLIPSE STOVE CO.,

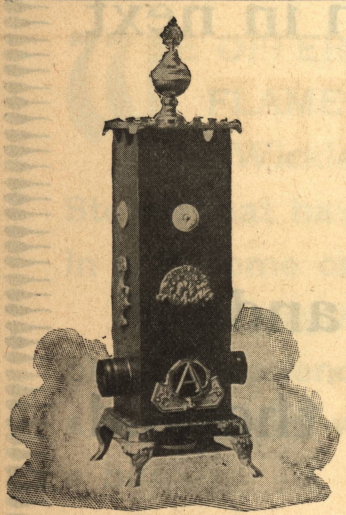
MANSFIELD, OHIO.

REPOSITORIES.

Omaha, Neb., OSCAR MILLSAP, Mgr.
St. Anthony Park, Minn., GRUENHAGEN BROS., Mgrs.

ODORLESS HEATERS AND HOT PLATES.

IF IN DOUBT, ORDER SAMPLE *ON APPROVAL.* Freight Prepaid.



No. 3.

LAWRENCE Heaters and Hot Plates are GUARANTEED to be ODORLESS.

A DEPARTURE from the old principle of construction has brought the trade what they want—

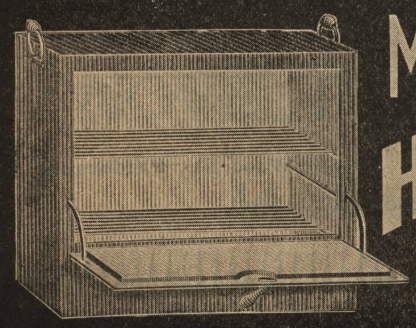
AN ODORLESS COOKER.

Inquiries Solicited.

Territory to live Jobbers.

ACME GAS STOVE CO.,
BUFFALO, N. Y.

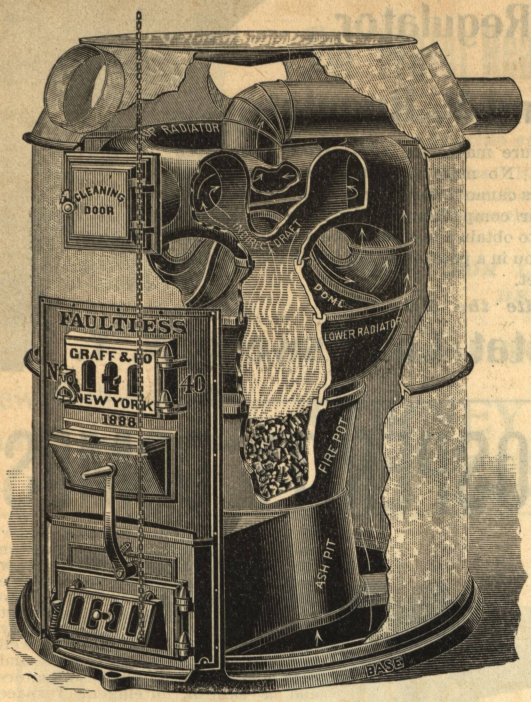
"Good Morning—I've used an ACME OVEN."



MANUFACTURED BY
H. ADLER CO.
241-243-1ST. AVE.
AND 238-2ND. AVE.,
PITTSBURGH, PA.

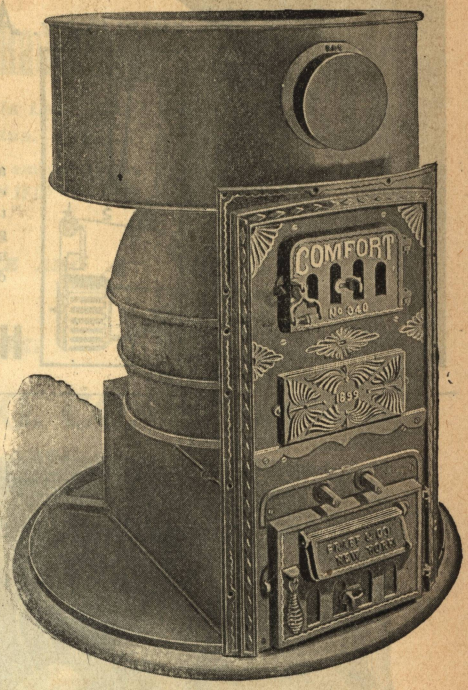
J. M. LITCHFIELD, Ag't.
105 BEEKMAN ST.
NEW YORK.

FAULTLESS and COMFORT.



TWO STYLES OUT OF MANY.

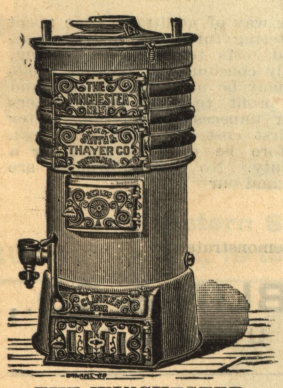
TURN OVER A NEW LEAF of our Catalogue and you will discover other styles of GOOD-SELLING, PROFIT-MAKING, CUSTOMER-KEEPING **FURNACES.**



Investigation Costs You Nothing.

GRAFF & CO., Manufacturers,

208 Water Street, New York.



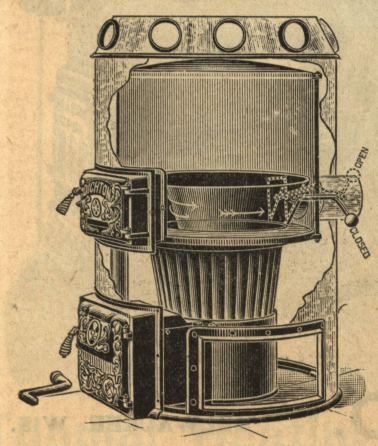
THE WINCHESTER.

WINCHESTER

UNEEDA HEETA. The above cabalistic words probably indicate the condition of most steam fitters at the present time They are Filipino-like in looks, but decidedly American in pronunciation. At all events, the wise man will take our advice and buy a "WINCHESTER" for either steam or water contracts. SMITH & THAYER COMPANY, Boston, Mass.

HEATER.

DON'T MONKEY WITH THE COLD AIR BOX!



If the 28-inch Pot Furnace you put in don't do the work buy a Dighton to use instead.

A 31-INCH FIRE POT DIGHTON $67.50 FOR A LITTLE WHILE ONLY.

You will pay more later in the season. It's worth a great deal more.

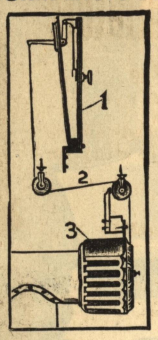
DIGHTON FURNACE CO., No. Dighton, Mass.

Howard

SIMPLICITY. **Automatic Draft Regulator**

ALSO

Sprague D. and V. Regulator.

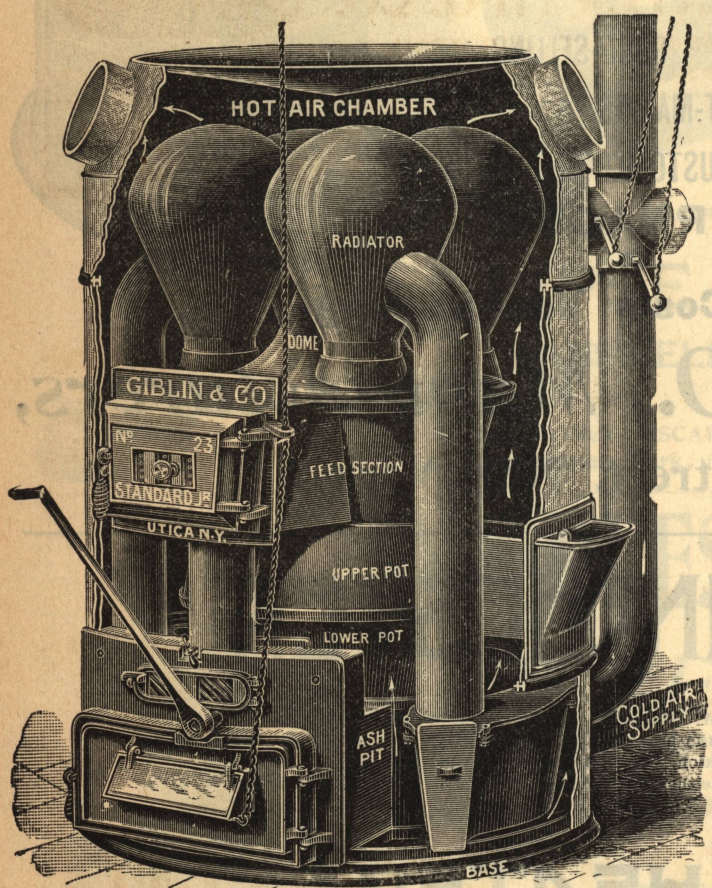


1..Thermostat.
2..Pulleys.
3..Damper or Motor.

The acmes of simplicity. This feature makes an ***unlimited guarantee*** and a popular price on them possible. No more parts than is necessary—just enough to be efficient. Your customers cannot afford to run their heaters without them, and you cannot afford to let your competitor get the agency. We will now give fall terms, which will enable you to obtain a test before bills come due. The two machines worked together will place you in a position to bid for all classes of work, and defy any competition which may be met.

Write the Mfrs.,

Howard Thermostat Co., Oswego, N. Y.



PROSPERITY COMES

to the well equipped furnace dealer and without an efficient article in the way of a furnace, no matter how prosperous the times are, trouble and loss will result. People who build residences in these times want to know that they have a thoroughly efficient heater and that it is well installed. We have the heaters, and with a combination of these heaters and a skillful, intelligent furnace setter we guarantee satisfaction to every buyer.

DOING FURNACE BUSINESS

year after year at a loss means mistakes somewhere, and prudent dealers will consider whether or not the furnaces they sell have anything to do with their loss.

AFTERCLAPS

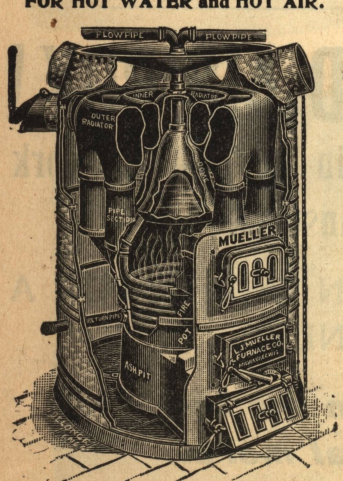
in the way of additional time spent in altering furnaces, in making repeated tests to show the working, quickly consume any possible profit that may be made on the sale and turn profit to loss. Our heaters render unnecessary anything after the first cost and the profit can therefore be counted upon for a certainty. No better furnaces are made and our

CATALOGUE

will demonstrate this.

SEND FOR IT NOW. **GIBLIN & CO.,**
UTICA, N. Y.

FOR HOT WATER and HOT AIR.



MUELLER

HOT AIR FURNACES.

COMBINATION HEATERS,

STEAM AND HOT WATER BOILERS.

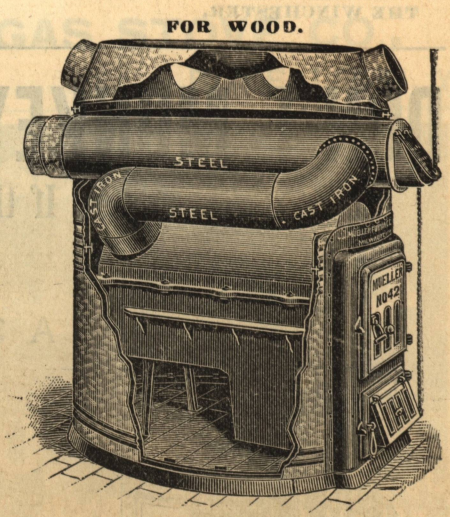
Large variety for all kinds of fuel.

WRITE FOR CATALOGUE AND PRICES.

We are also jobbers of everything pertaining to the heating trade.

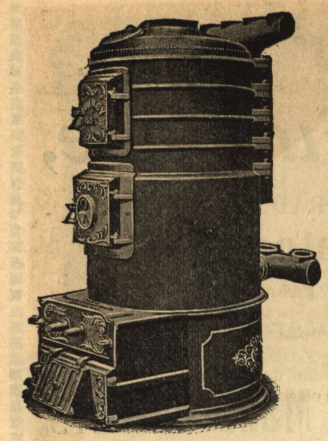
ESTABLISHED 1857.

FOR WOOD.



Low in Price.

L. J. MUELLER FURNACE CO. 190 Reed St., MILWAUKEE. WIS.



"400 Series" Hot Water Heater. Perspective View.

Gurney

Hot Water Heaters, Steam Boilers, Radiators

Represent the advance made of late years in the scientific construction of heating apparatus.

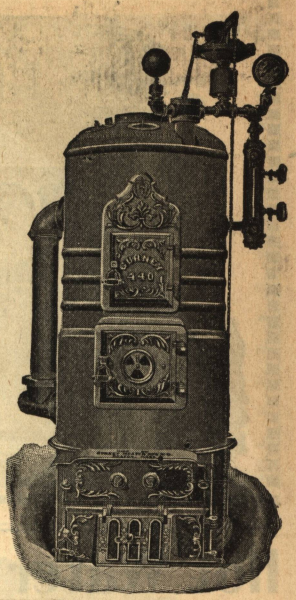
Our "400 Series" Hot Water Heaters and Steam Boilers embody all the latest approved ideas of construction They are of the sectional type with push nipple joints, and have the improved revolving grate.

SEND FOR LATEST TRADE CATALOGUE AND DESCRIPTIVE CIRCULAR.

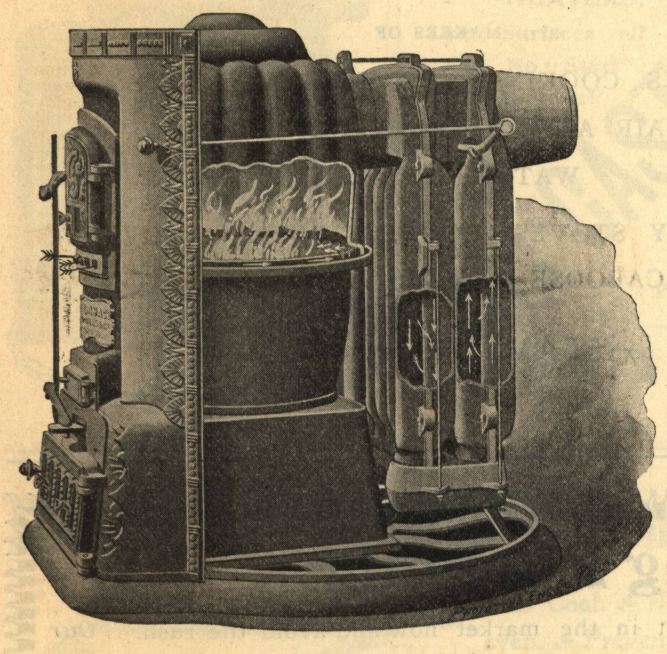
SOLD ONLY THROUGH THE TRADE.

New York Branch:
111 Fifth Ave., cor. 18th St.,
NEW YORK, N. Y.

GURNEY HEATER MFG. CO.
HEAD OFFICE: 74 FRANKLIN ST., COR. ARCH,
BOSTON, MASS.



"400 Series" Steam Boiler. Perspective View.



Eastern Selling Agents:
GURNEY & CO., 19 to 25 Eliot St., Boston, Mass.

OUR .... BENGAL

HOT AIR FURNACE IS THE

Most Powerful and Compact Furnace

Ever produced. It has more radiating surface than any other furnace of the same size, yet is

ONLY 43 INCHES HIGH.

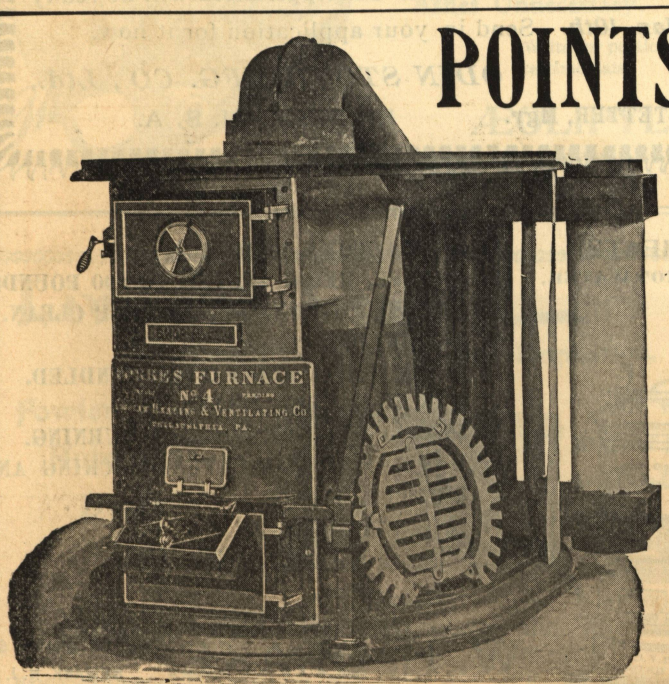
Suits any kind of Cellar.

Burns Hard or Soft Coal, Wood or Coke.

WRITE FOR DESCRIPTIVE CIRCULARS.

FLOYD, WELLS & CO.,
ROYERSFORD, PA.

POINTS OF EXCELLENCE



TO BE FOUND IN THE

FORBES

Warm Air Furnace:

GREAT EFFICIENCY, 88 per cent. by actual test.
GREAT ECONOMY.
GREAT CAPACITY.
GREAT DURABILITY.
ABSOLUTELY GAS TIGHT.
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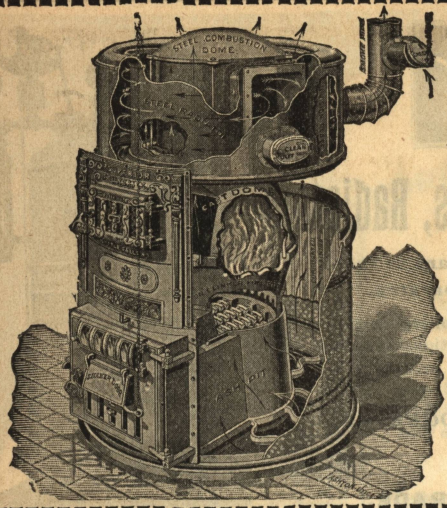

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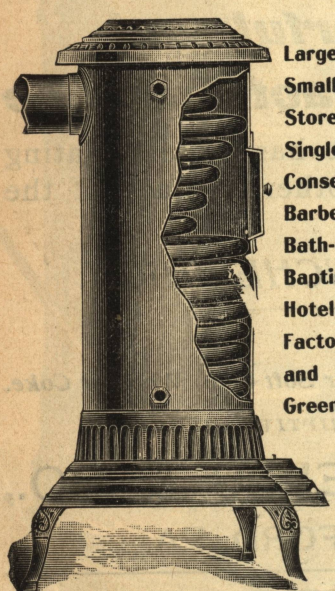

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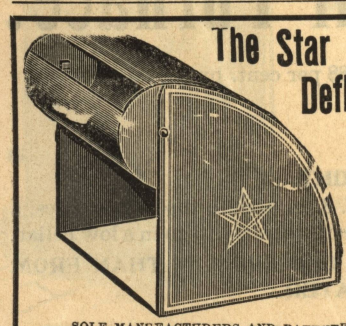

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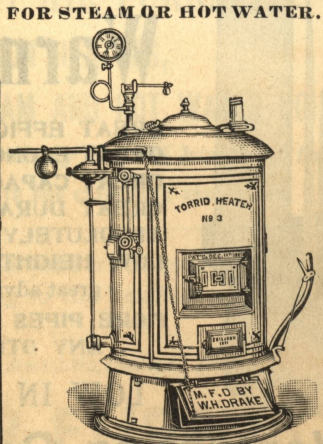

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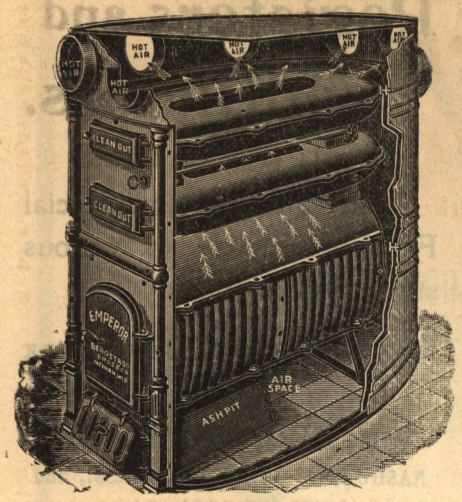

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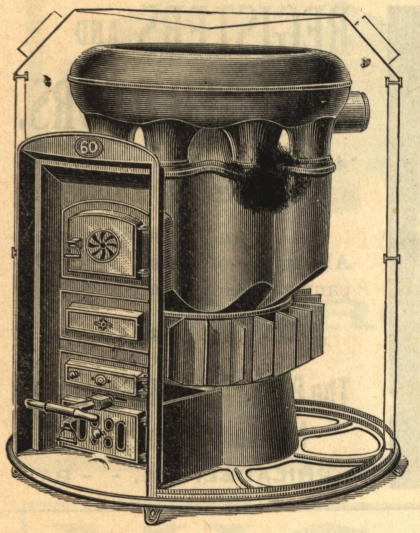

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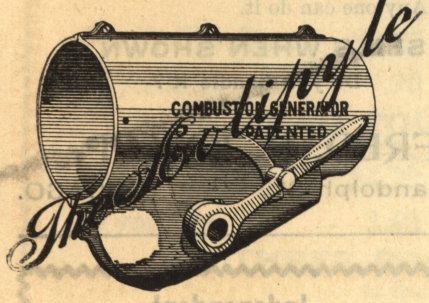

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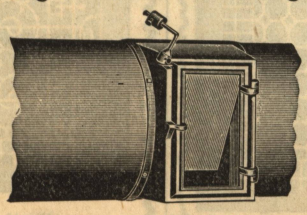

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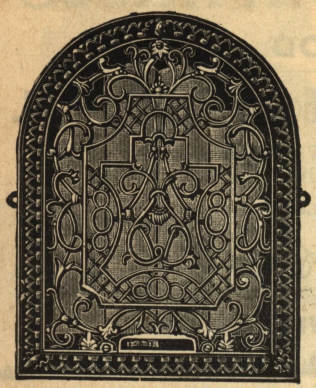

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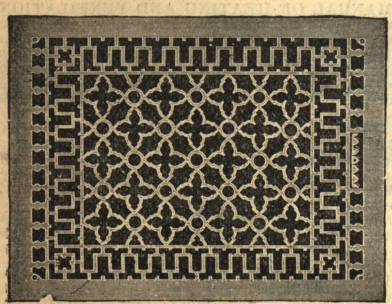

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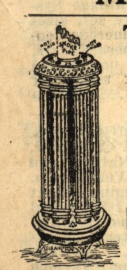

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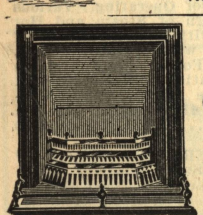

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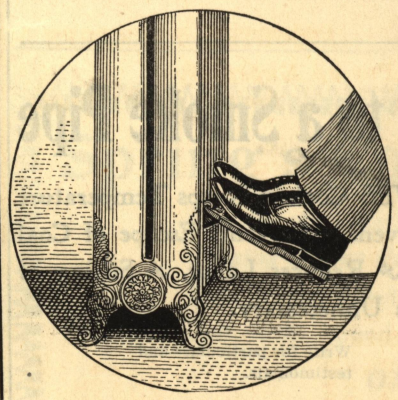

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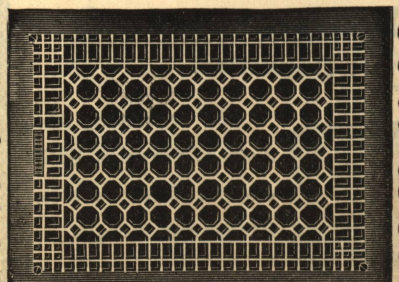

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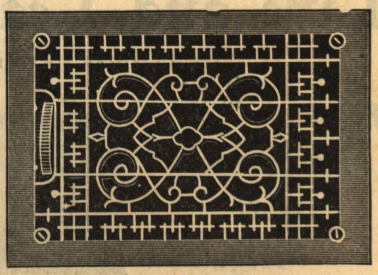

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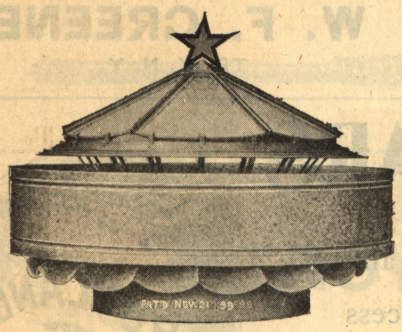

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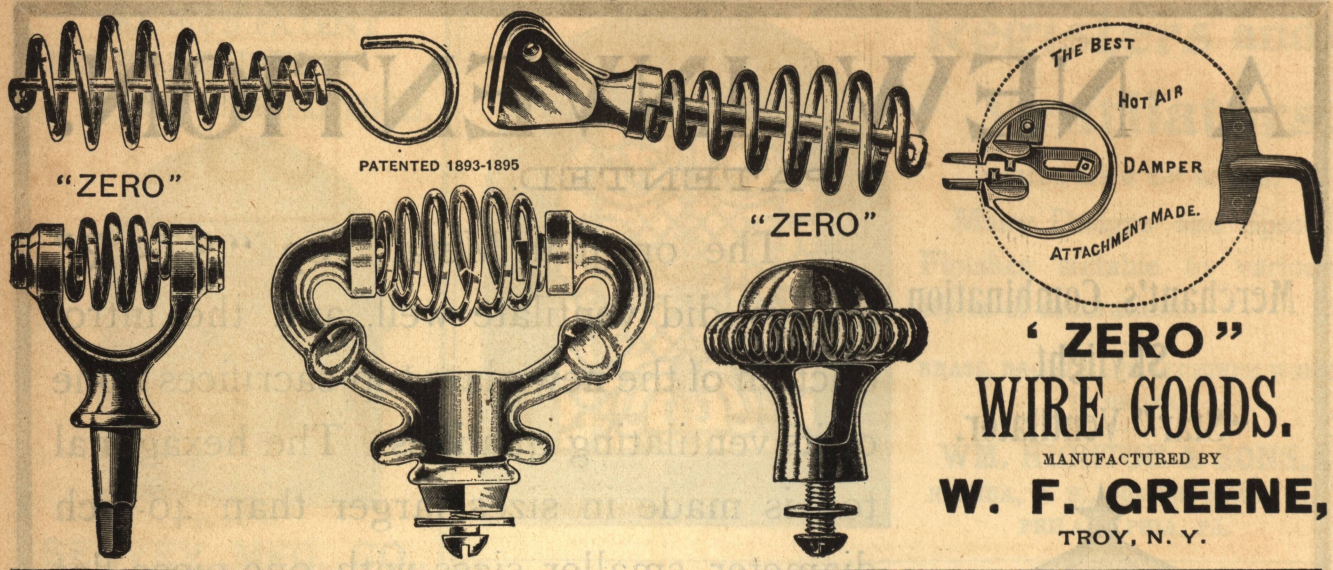

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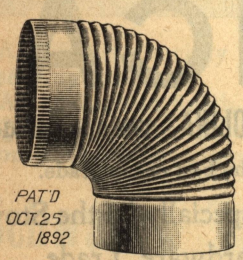

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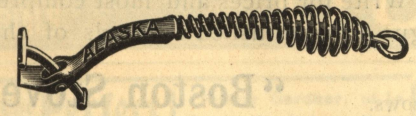

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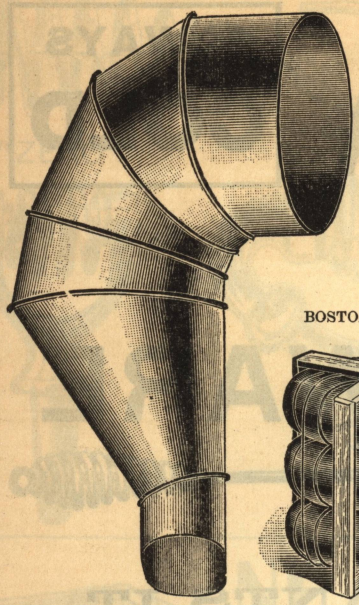

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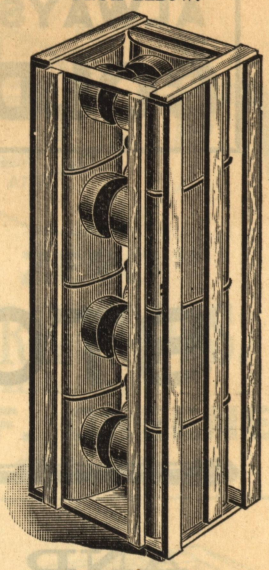

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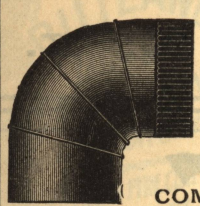

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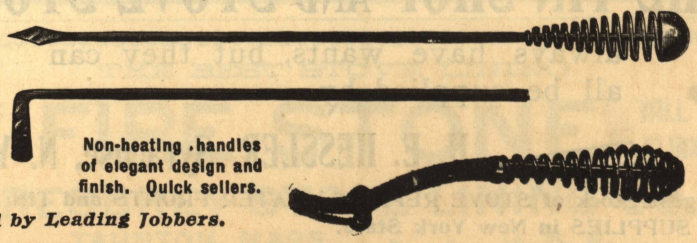

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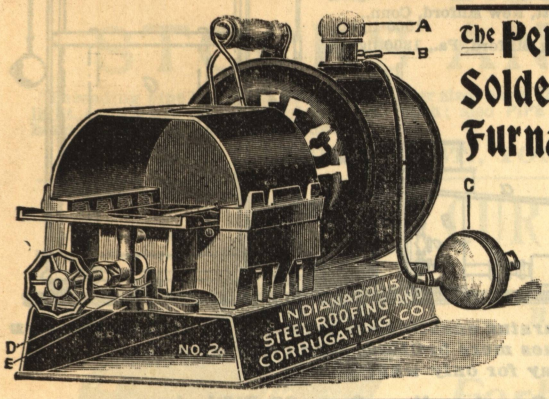

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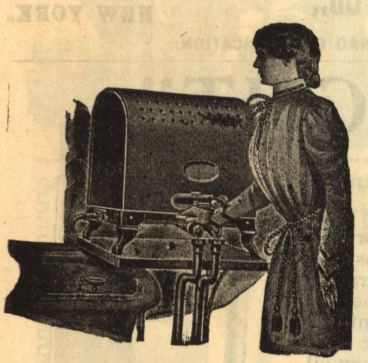

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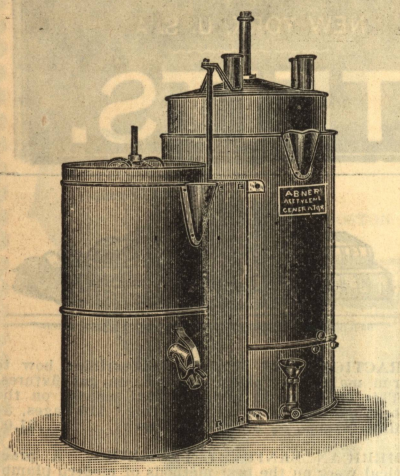

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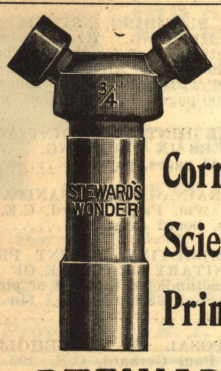

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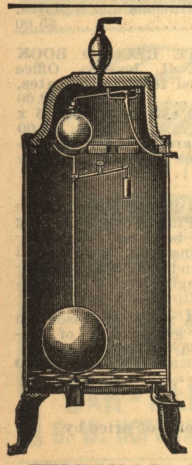

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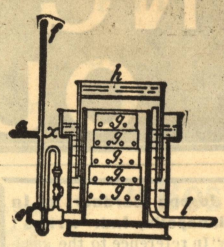

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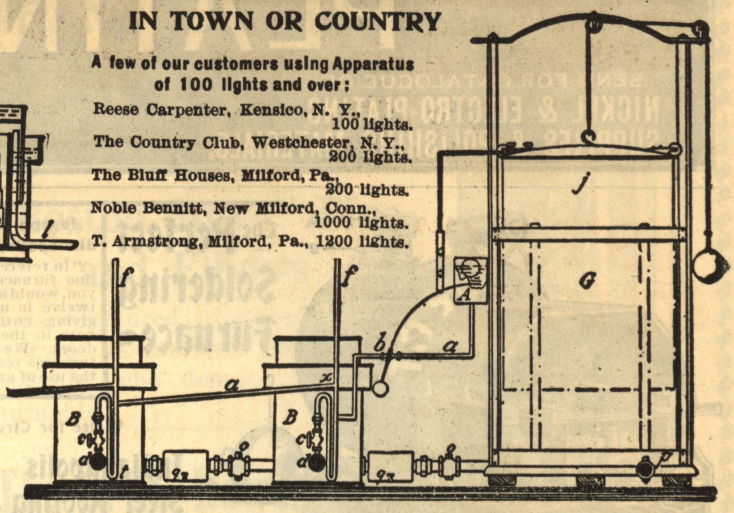

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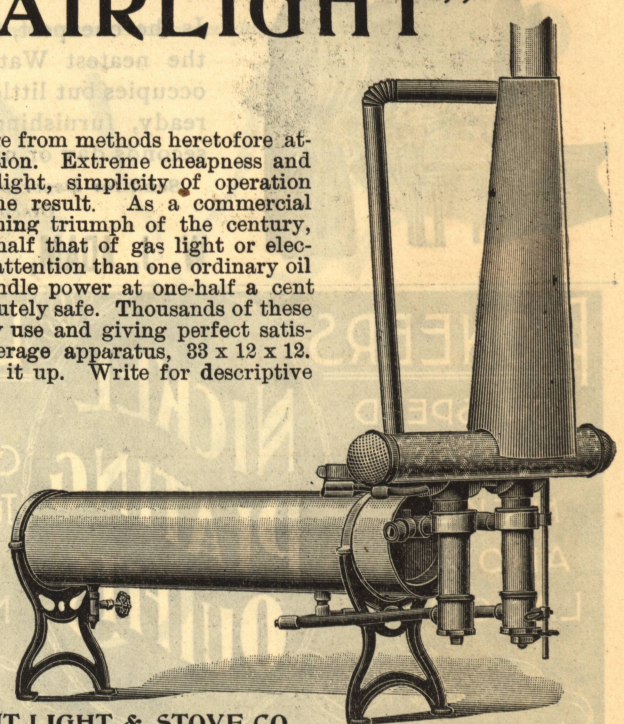

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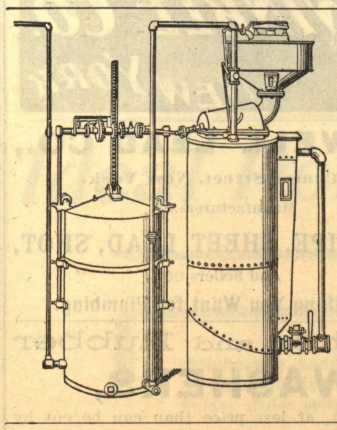

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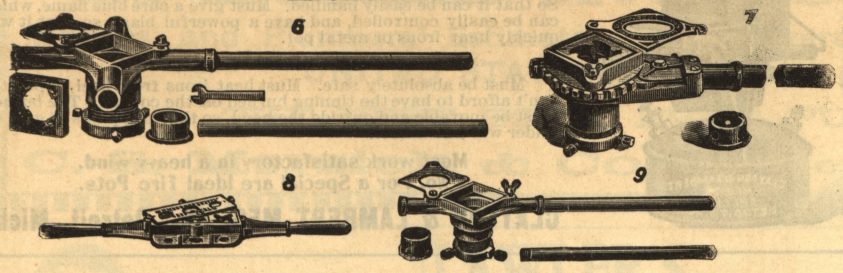

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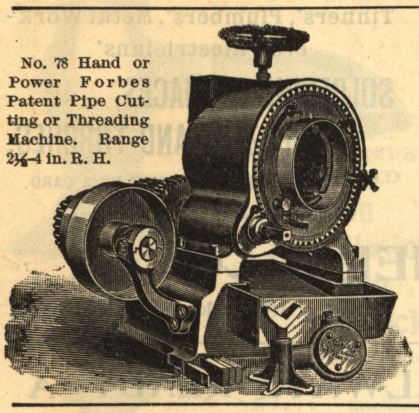

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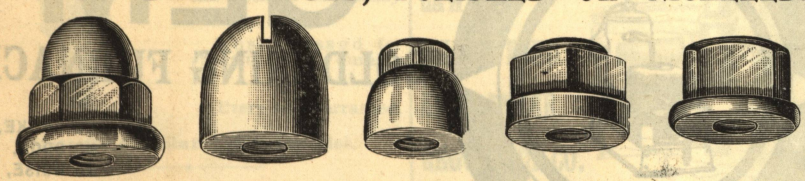

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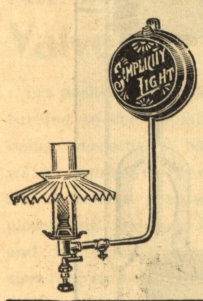

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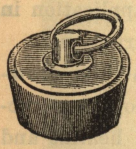

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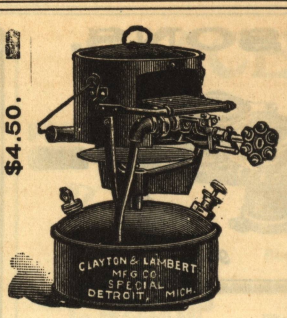

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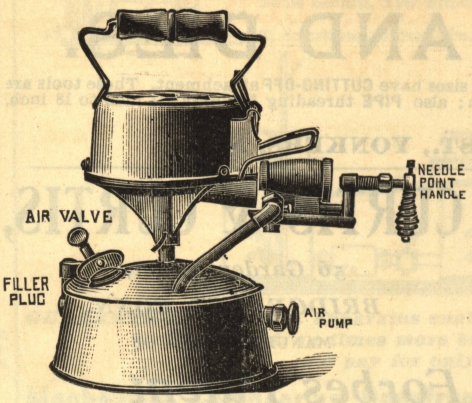

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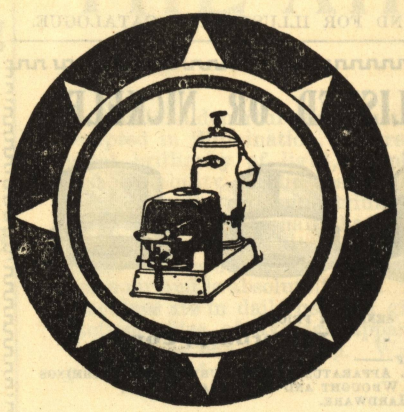

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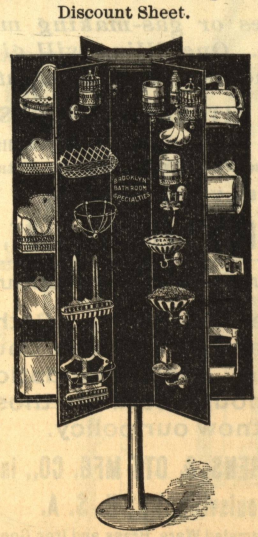

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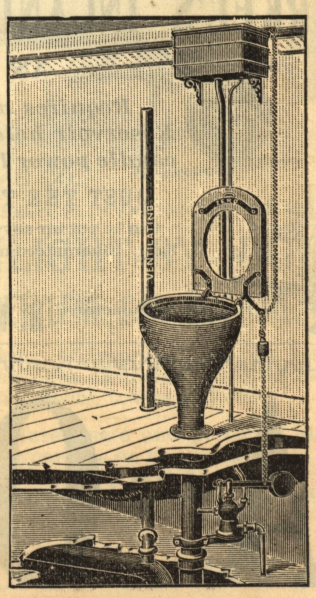

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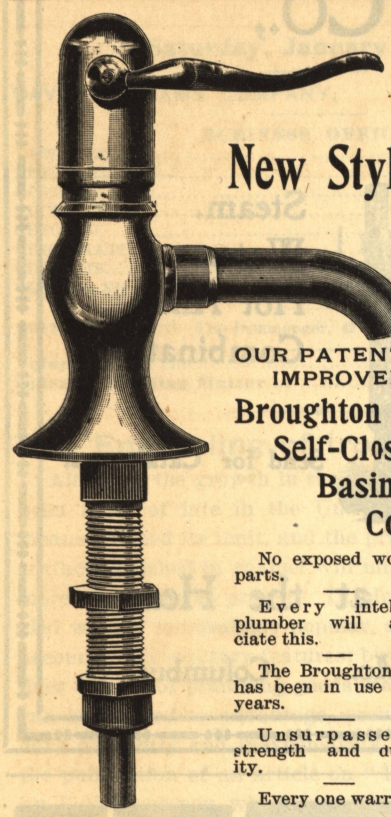

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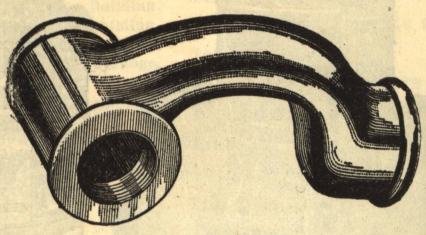

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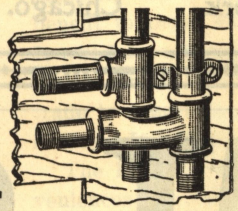

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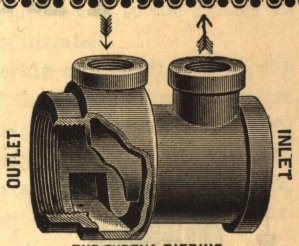

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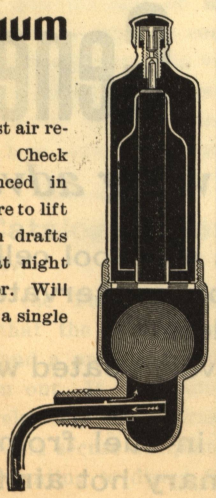

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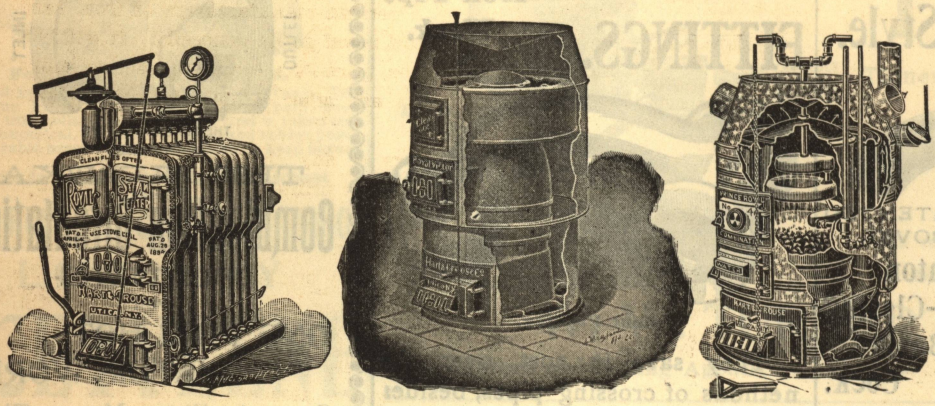

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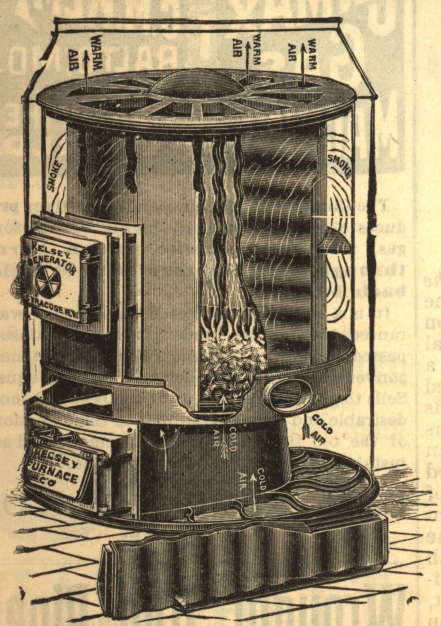

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THE METAL WORKER.

NEW YORK AND CHICAGO.

Saturday, January 13, 1900.

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Volume LIII.....No. 2.
Index to Reading Matter.....Page 54.

The Enameling of Iron.

Although the growth in the use of enameled ware has been rapid of late in the United States, it has by no means reached its limit, and the probability is that metal surfaces finished in enamel will multiply into very many more uses than at present. In plumbing fixtures enameled ware is increasingly popular, as it deserves to be on account of its sanitary features; but there are many other lines outside of plumbing goods where the enameler's art can be utilized to advantage, provided the work can be done efficiently and inexpensively. We begin this week the publication of an article on "Enameling Cast Iron," by J. Vollkommer, which contains a great deal of practical information. It tells how to treat the iron, how to prepare the enamels, what their composition is and how to apply them. It goes without saying that the art of enameling is not to be acquired instantly by reading a description of how to do it. Skill tells here as much as in other lines of work, perhaps a little more, and experience will have to complete the education reached by reading. Nevertheless there is a foundation in these articles, when taken in connection with a serial previously published on "The Manufacture of Enamels," which should prove invaluable to any one contemplating this kind of work. The use of enamels is very much larger abroad than it is here, but it is needless to point out the possibilities of this work, for any one thinking for a moment will see in how many different lines enameled metal is applicable.

Request for Catalogues for the Paris Exposition.

Preparations for the Paris Exposition have now progressed so far that the available space has been practically allotted and a preliminary list of the exhibitors has been given out. It was quite evident at the outstart that only relatively few representatives of our leading industries would secure adequate space and that facilities would be wanting to direct foreign buyers to the sources of the endless variety of products of the metal trades.

Realizing that this constituted an opportunity to do good service to the metal and allied industries, the publishers of *The Iron Age* and *The Metal Worker* brought to the attention of the United States Commission an undertaking which met with their cordial approval and co-operation, and led to the assignment of a well located space for the exhibit in the Department of Mining and Metallurgy close to the stairway which leads to the gallery in which the hardware section is installed.

The plan consists in gathering and exhibiting at the Paris Exhibition a Library of the Commercial Literature published by the American manufacturers of iron, hardware, machinery and metal goods generally. It will consist of the catalogues, price-lists, circulars, section books, description of plants and other commercial printed matter in these lines.

All manufacturers of any class of metal goods are requested to send us their printed matter for this library, addressing it to "The Iron Age (Paris Library), 232-238 William street, New York." We would be glad to have the collection include every printed document used in the trade. No charge whatever will be made in any form. No goods will be sold. No special prominence will be given to any manufacturer.

A catalogue giving the names and addresses of all manufacturers represented in the library will be distributed at the exposition, and widely circulated by mail in the various European countries. As it will indicate concisely the character of their products, it must be of benefit to those manufacturers who are included in it. It will form a live directory of the American metal trades which cannot fail to attract the attention of the foreign trade to American goods, as well as draw visitors to the library. It will contain no advertising.

The library will be handsomely fitted up with conveniences not only for storing, but also for comfortably consulting the documents of which the library will consist. Our installation has been designed by the architect of the United States Commission, and will be built and set up by the official contractor. It is therefore sure to be not only creditable in appearance, but also in harmony with its surroundings.

The library will be in charge of competent persons, speaking English and French, able and willing to aid those desiring information about American metal products. It will be carefully arranged, indexed and catalogued in such a way that foreign buyers will be able to find any catalogue or price-list they may desire, and to study any subject in which they may be interested. It will include the current numbers of *The Iron Age* and *The Metal Worker*, as well as files of these publications.

We feel convinced that the undertaking, whose main features we have outlined, will prove of much service in promoting the export trade in American metals and metal goods, and we feel confident of the co-operation of American manufacturers, who will favor us by a prompt response.

Failures in 1899.

Among the tests of business prosperity none is found more reliable than the record of commercial failures. In this respect the year 1899 stands in remarkably favorable comparison with the years that have gone before. Notwithstanding that several important failures fell into the last few days of the year, adding several millions to the total of liabilities, the commercial mortality was smaller than in any other year of the past twenty-five, excepting 1880 and 1881, while the average of liabilities per failure was less than in any previous year, and

most important test of all, the rate of defaults to solven payments through clearing houses was the smallest ever known. Moreover, the falling off in failures last year was not only in the aggregate, but was also shown in every section of the country and in all classes of business. Such uniformity of improvement throughout the country is extremely rare, and would be impossible if business conditions were not generally sound and prosperous. The total number of business failures last year, according to the returns of *Dun's Review*, was 9337, as compared with 12,186 in 1898, 13,351 in 1897 and 15,088 in 1896. The liabilities of 1899 aggregated $90,880,000, as against $130,663,000 in 1898, $154,332,000 in 1897 and $226,097,000 in 1896. In the panic year, 1893, they amounted to $346,780,000. Had it not been for the nest of failures resulting from the speculative collapse in Boston at the close of the year, the aggregate of liabilities for 1899 would have been about $21,000,000 less than it was, or under $70,000,000. Of the $90,880,000 commercial defaults last year, $30,792,000 were in manufacturing, against $57,544,000 in 1898, and $48,925,000 in trading, as compared with $61,918,000 in the preceding year. The decline in manufacturing and trading failures was larger than ever before in every section, except New England, where a number of concerns became involved in the troubles before referred to. In New York the manufacturing failures were only about one-quarter of those in two years of the previous five and but half those of the other three preceding years. All other sections of the country display strikingly favorable comparisons, showing the lowest average of commercial liabilities ever reported.

Heavy Fire Losses.

Unlike the great majority of business interests the fire insurance companies found the year just closed a very disastrous season. Many of these concerns, it is feared, will show a heavy loss on their year's operations. The fire loss statistics of the New York *Journal of Commerce* for 1899 show, for the United States and Canada, a total of $136,773,200, an increase over 1898 of $17,000,000, $26,000,000 over 1897 and $30,000,000 over 1896. During the past year there were eighteen fires each of which involved a loss of over half a million dollars, the largest individual loss being in Philadelphia, where $1,725,000 worth of property was wiped out in the large department store and publishing house conflagration in November. The Windsor Hotel fire in New York City and the big fire which devastated Victor, Col., each inflicted over $1,100,000 of damage. Other big fires of the year occurred with losses between $500,000 and $1,000,000 in Chicago (three), Columbus, Ohio; Dawson City, Alaska; Philadelphia, St. John, N. B.; Toledo, Ohio; Cincinnati, New York City, Brooklyn (two), Augusta, Ga., and Montreal, Canada. The fires exceeding $10,000 in destructiveness numbered 2345. That an average of $11,400,000 worth of property should have gone up in smoke each month in spite of all our improved fire fighting facilities seems a deplorable waste. The fire underwriters are naturally much discouraged over the outlook and are planning for united action in the direction of higher rates for insurance in the current year.

Owing to the fact that a considerable number of Southern iron furnaces were banked during the holidays the blast furnace returns of *The Iron Age* for the first of this month show that the pig iron productive capacity of the country entered the new year at a smaller rate than that recorded on December 1. This, while only a temporary feature, served to counterbalance the blowing in of a number of furnaces which had been out for repairs. There were 280 furnaces in blast on January 1, with a weekly capacity of 294,186 gross tons, as compared with 283 furnaces, with a capacity of 296,959 tons, on December 1, 1899. Furnace stocks showed a modest increase in a good many districts, the total being placed at 127,346 tons on January 1, or 14,300 tons ahead of the figures of the preceding month. This, however, is so insignificant as to be hardly worth consideration. A number of additional stacks are slowly getting ready for work, and the output is likely to go on increasing, barring accidents. The fuel supply is the chief cause of anxiety just now, and there are reports of banking of furnaces in some quarters. This may possibly serve to check production to some extent in the immediate future.

Bradstreet's compilation of bank clearings at seventy-eight leading cities of the United States for the calendar year 1899 shows them to have reached the enormous aggregate of $93,504,932,656. This is an increase of 36.5 per cent. over 1898, of 63 per cent. over 1897, more than double the aggregate clearings of 1894 and 51 per cent. above those of 1892, the last year of large business preceding the depression. Gains were naturally the heaviest in the Middle States, including New York, which showed 44.8 per cent. increase; but in no case did any group fall below 12 per cent., and the majority of the groups of cities showed gains in excess of 20 per cent. A curious change in the relative rank of the clearing house cities in 1899 was the fact that Boston went ahead of Chicago in the volume of bank clearings, taking second place after New York, with Chicago third, Philadelphia fourth, St. Louis fifth, Pittsburgh sixth and Baltimore seventh; San Francisco, Cincinnati, Kansas City, Minneapolis, Cleveland and New Orleans following in the order named. Nearly two-thirds of the total clearings are credited to New York.

Andrew Carnegie has given a sum of $25,000 to the General Society of Mechanics and Tradesmen of New York City, to be used in fitting up the society's new Mechanics' Institute at 18 to 25 West Forty-fourth street.

William A. Eddy of Bayonne, N. J., the well-known kite expert, a few evenings ago demonstrated the possibility of using acetylene gas for night signaling from kites high in the air. He succeeded in sending up a flag 800 feet by means of kites and then illuminating it with a 100 candle power acetylene light. The rapid fluttering of the flag produced the effect of a stream of red, white and blue fire extending 10 or 12 feet beyond the searchlight reflector. Mr. Eddy believes that his experiments prove a new system of war signaling, involving a great variety of color and light effects visible from a great distance, can be developed by the aid of kites and acetylene illumination.

Speaking recently on the congestion of London Sir J. Wolfe Barry, the noted English engineer, expressed the belief that the retardation of business traffic between the east and west of the city, more especially coal traffic, cost the trade interests of London $4,500,000 a year, the owners of vehicles, $6,000,000, and pedestrians $325,000, or a total of nearly $11,000,000 a year. This he would correct by cutting a single mighty arterial thoroughfare 125 feet wide and 5½ miles long from east to west, which, with its subsidiary connections, would cost about $30,000,000. This had been ridiculed when originally proposed, but Sir. J. Barry believed that when the loss under existing conditions was fully understood, it would be found that the saving would fully repay the cost.

FURNACE HEATING.*

BY WM. G. SNOW.

CHAPTER VI.

HEATING OF PUBLIC BUILDINGS, CHURCHES AND STORES.—(*Continued*).

AREA OF COLD AIR BOX.

In churches and public buildings the area of the cold air box—see Fig. 41—should be 90 to 100 per cent. of the combined capacity of the furnace pipes. This is especially important for heating and ventilating in mild weather, when a small amount of heat but a large supply of air is desired. This can be secured only by using large flues and cold air box.

FRESH AIR INLET.

The best location for the cold air inlet is on that side of the building which faces the prevailing cold winds. It is often necessary, however, to place it elsewhere to avoid making the box of excessive length.

When the heating is intermittent the use of a return duct—see Fig. 42—materially lessens the time and fuel consumed in warming the building. This return duct may be run independently to the furnace, or, as more commonly arranged, may be connected with the cold air box as shown in Fig. 42.

LOCATION OF FURNACE AND AREA OF FLUES.

The furnace should be located as nearly as possible under the warm air flues leading from it. For ordinary calculations it will be found convenient to assume a velocity of 300 feet per minute in flues leading to the first or second floors. Dividing the volume in cubic feet per minute by 300 gives the area of the flue in square feet. For more exact calculations use Table XIV. In determining the size of flues from this table it is well to select a velocity corresponding to a difference in temperature not greater than 40 to 50 degrees, in order that the flues shall be large enough to provide a proper air supply at all times.

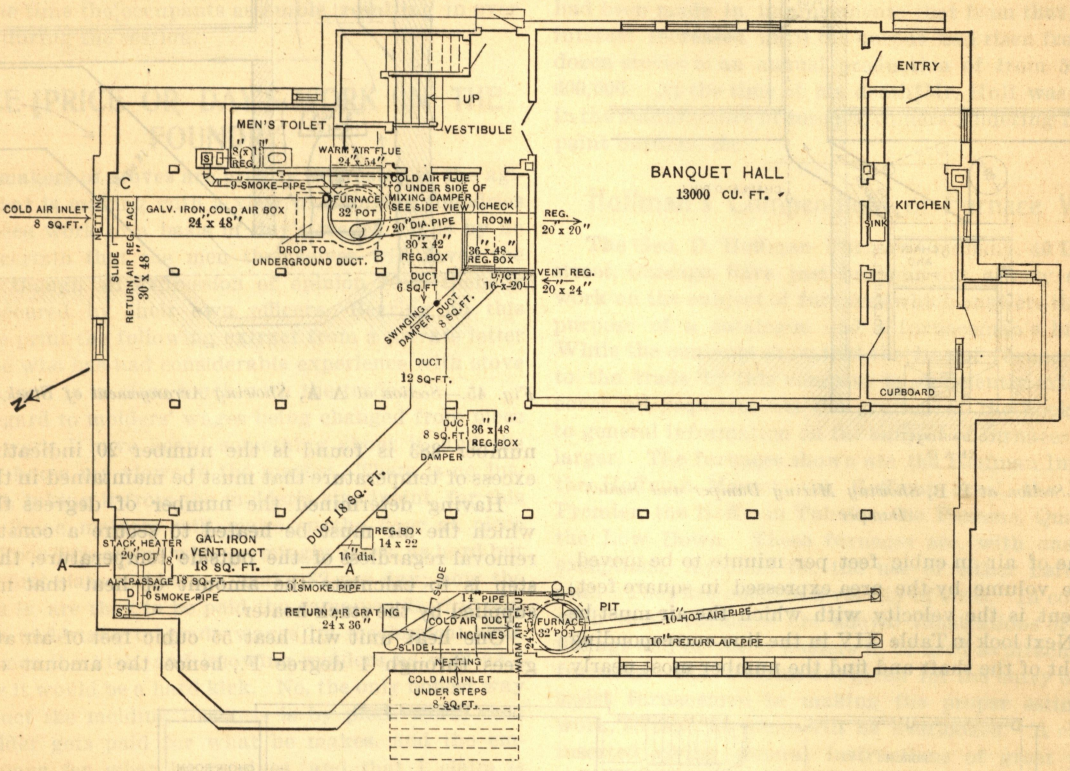

Fig. 41.—Furnace System of Heating and Ventilating a Church.—Basement Plan.

LOCATION OF REGISTERS.

It has long been the custom to locate the registers in the aisles, placing the furnaces directly under them. There are several objections to this arrangement. The hot air ascends immediately to the ceiling, causing an excessively high temperature at the top of the room and a correspondingly great loss of heat through the roof. The registers become the receptacles of dust and filth, over which the fresh air must pass. It is better practice to discharge the warm air through openings placed 7 or 8 feet above the floor, as in schoolhouses.

The ventilating registers are placed, as in Fig. 44, in or near the floors, in the best position to secure a thorough distribution of the air throughout the seating space. Foot warmers should be located in the entrance hall or near the doors.

VENTILATION.

Ceiling ventilators are generally provided, but should be no larger than is necessary to remove the products of combustion from the gas lights. If made too large much of the warmest and purest air will escape through them.

The ventilating system should be connected with a duct leading to a shaft, having a stack heater—Fig. 45—or a fan to accelerate the air current. In cold weather

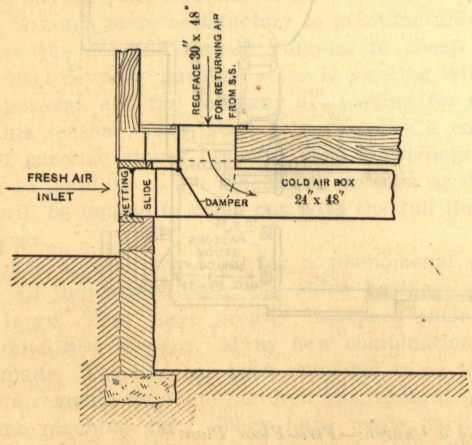

Fig. 42.—Detail of Return Air Connection at C, Fig. 41.

* Copyrighted, 1899, by David Williams Company.

the natural draft will in most cases be found sufficient. The construction and arrangement of stack heaters has been fully discussed in the preceding chapter.

SIZE OF STACK HEATER.

To determine the size of the stack heater is a simple matter. Knowing the hight and area of the shaft and

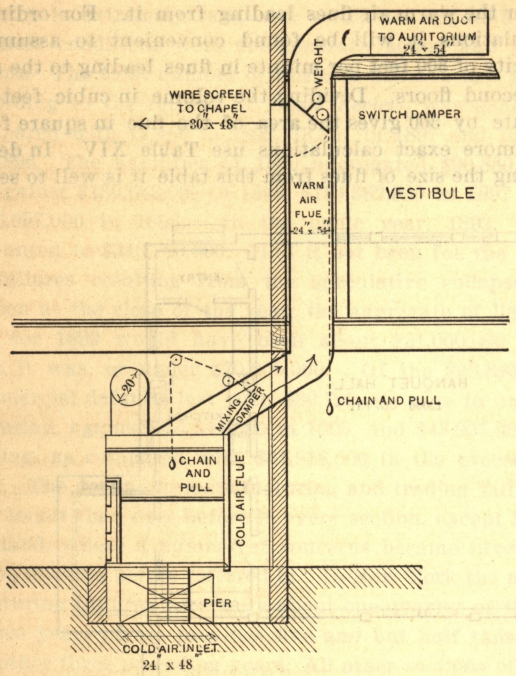

Fig. 42.—*Section at* B B, *Showing Mixing Damper and Switch Damper.*

the volume of air in cubic feet per minute to be moved, divide the volume by the area expressed in square feet; the quotient is the velocity with which the air must be moved. Next look in Table XIV in the line corresponding to the hight of the shaft and find the number most nearly corresponding with the estimated velocity. At the head of this column is given the excess of temperature that must be maintained in the shaft.

For example, suppose we have a shaft 60 feet high, of 8 feet square area, and that 3000 cubic feet must be discharged per minute; $\frac{3000 \text{ cubic feet}}{8 \text{ square feet}} = 375$ feet velocity. Following along the line in Table XIV, opposite the hight of 60 feet in the column at the left we come to the number 383, which most nearly corresponds to the required velocity, 375. At the head of the column in which the

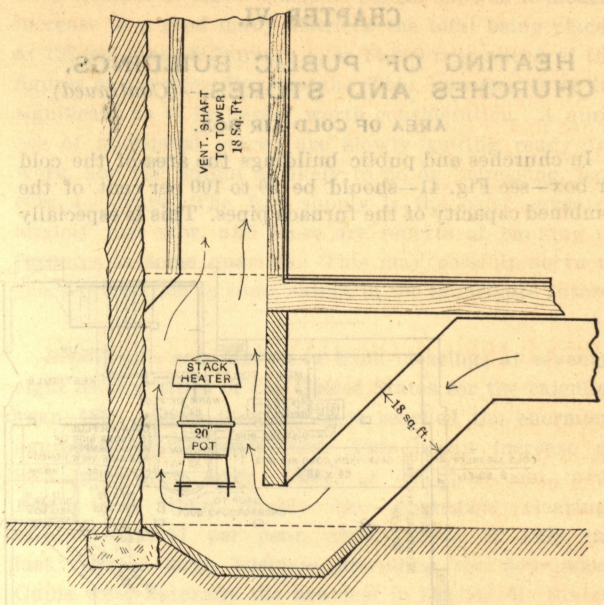

Fig. 45.—*Section at* A A, *Showing Arrangement of Stack Heater.*

number 383 is found is the number 20, indicating the excess of temperature that must be maintained in the flue.

Having determined the number of degrees through which the air must be heated to secure a constant air removal regardless of the outside temperature, the next step is to calculate the amount of heat that must be supplied by the stack heater.

One heat unit will heat 55 cubic feet of air at 70 degrees through 1 degree F., hence the amount of heat

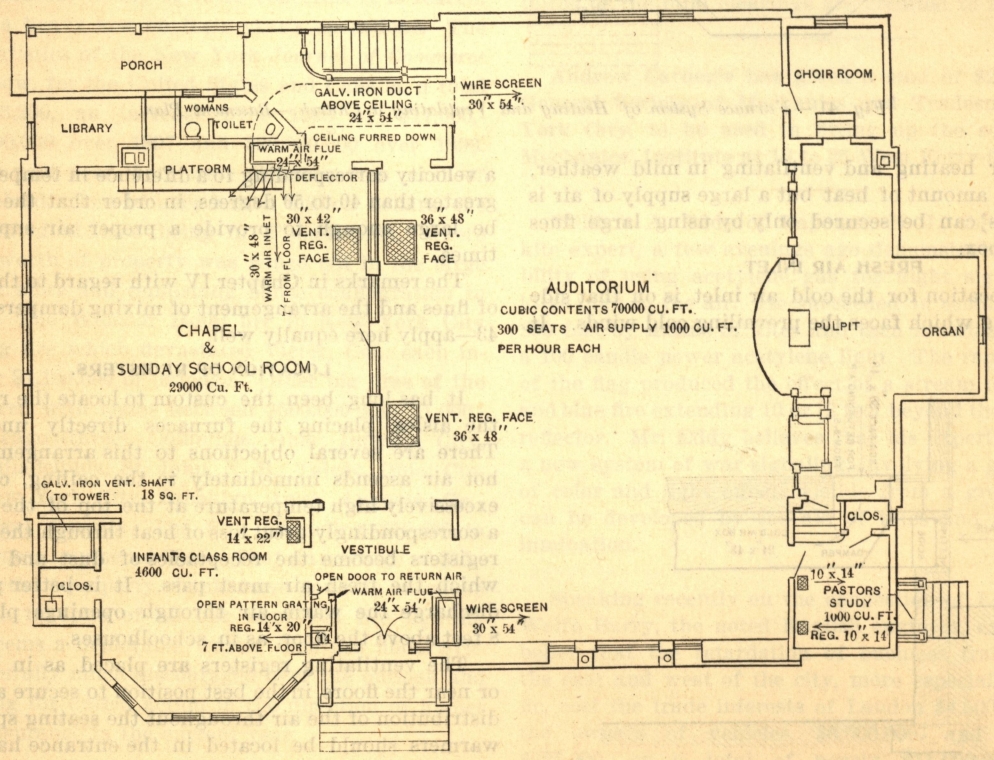

Fig. 44.—*Furnace System of Heating and Ventilating a Church.—First-Floor Plan.*

required to raise a given volume through any number of degrees will be expressed by the equation:

$$\frac{\text{Volume of air in cubic feet per hour}}{55} \times \text{Number of degrees}$$

temperature must be raised = Heat units required per hour. This divided by 40,000 (the heat utilized per hour per square foot of grate) gives the area of grate required,

from which the diameter of fire pot may be readily determined.

JANITORIAL SHORTCOMINGS.

The importance of the stack heater is very apt to be overlooked by the janitor, who generally considers the heating as the all important matter. Unless his work is under intelligent supervision, which is seldom the case, the stack heater is quite likely to remain idle and the flow of air through the ventilating registers to be very sluggish.

Among other shortcomings of the janitor may be mentioned taking the air supply from the cellar or from the return duct intead of from out of doors, which should be the only source of supply while the rooms are occupied; also, allowing insufficient time to warm the building after a period of disuse, forcing the fires until they are hottest about the time the occupants assemble, resulting in overheating during the session.

PIECE PRICE OR DAY'S WORK IN THE FOUNDRY.

The makers of stoves are greatly interested in the agitation that is making with a view to changing foundries from piece work to a basis of day's wages. It is by no means certain that the men themselves will favor the change, though an expression of opinion from them is being secured by their own officers. Bearing on this topic we print the following extract from a private letter from one who has had considerable experience with stove molders, and is in close touch with the trade:

In regard to molders' wages being changed from piece to day work I have heard something about it, and the molders know my views in the matter. There is no justice in it, taking it from the molder's standpoint, for this reason: Some molders will make on the floor at piece work $5 per day, others who seemingly work as hard but are not first-class mechanics make $2 per day; now the question is, are they to be paid the same per day? if not, and you undertake to grade wages by mechanical skill, then comes the kick, and knowing molders as well as I do, I say it would be a hard kick. No, the only honest way to conduct the molding business is by piece work, then the molder gets paid for what he makes, and the employer pays for what he receives, and that I claim is justice on both sides. In selecting a day molder in a stove foundry we always try to secure the best, one that is considered sure in getting any piece he may put up.

Jewel Gasoline Stoves.

Geo. M. Clark & Co., 72 to 76 Lake street, Chicago, report their trade starting in better than for several seasons, notwithstanding the advance in list prices. Dealers are buying quite liberally of the higher priced goods, which is much more satisfactory to manufacturers than to have the demand largely running to cheap goods. The Jewel Security gasoline stove is meeting with general approval, and the company are looking for a large sale this season. They started in to make a complete line of gasoline stoves of sheet steel construction, but owing to inability to get machinery as soon as desired, they will be unable to come out with the full line until next year.

In gas stoves they look for a phenomenal season. From all indications their gas stove business will be very large. They have greatly increased their styles and added new designs. Many new combinations have been made. The line has been extended so as to cover all requirements for manufactured gas, natural gas and gasoline machine gas. They have made particularly good progress in designing stoves to use gasoline machine gas, which is a field of usefulness for gas stoves that has always been highly desirable, but presented many difficulties to be overcome.

The export business of this company is increasing to such an extent that they have appointed C. B. Corwin, 15 to 25 Whitehall street, New York, as their New York export representative.

Martin L. Hull.

The vapor stove trade will regret to hear of the death of Martin L. Hull of Cleveland, Ohio, in the seventy-seventh year of his ago, which took place on January 3. Mr. Hull is considered the pioneer in the gasoline vapor stove business, he having secured from a Mr. Prentiss in 1876 a patented vapor gasoline burner, which he perfected in such a way as to make it practical, and thus started the vapor stove industry which has grown to such enormous proportions. The first burners made by him were on a wooden frame, and while the introduction was slow they kept increasing in favor until 1880, when such progress had been made in improvements that from that date the interest increased until the output had risen from a few dozen stoves to an annual production of from 500,000 to 600,000. At the time of his death Mr. Hull was engaged in the manufacture of torches, tinners' soldering furnaces, paint burners, &c.

Hoffman's Compendium of Furnace Work.

The Geo. D. Hoffman Furnace Company, 40 Dearborn street, Chicago, have just brought out a very complete work on the subject of furnaces which answers the double purpose of a catalogue and a furnaceman's handbook. While the contents show that the line of furnaces offered to the trade by this company is sufficiently extensive to cover all requirements the portion of the book devoted to general information on the subject of furnaces is much larger. The furnaces shown are the Hoffman Invincible, the Hoffman Mascot, the Hoffman Steel, the Hoffman Premier, the Hoffman Tubular, the Panama, Quaker and the Low Down. These furnaces are, with one or two exceptions, intended for the use of either hard or soft coal. They are made in a variety of sizes. In connection with these furnaces are shown illustrations of furnace fittings and of water heaters to be used as attachments to furnaces. Blank forms are given for the entry of data to assist furnacemen in making the proper estimates on work, so that no items will be overlooked. A chapter is inserted giving general instructions of great practical value for furnace work. Valuable rules are presented for determining the size of register and of pipe necessary to heat a given space. Suggestions in hot water piping are also inserted. Specimens of proposals and specifications for furnace work and for combination warm air and hot water heating are given. The construction of chimneys receives careful attention. Price-lists are inserted of registers, furnace pipe and fittings, galvanized sheets, hot water radiators, wrought pipe, cast iron fittings and other heating supplies, so as to enable furnacemen to quickly arrive at the estimated cost of installing a heating system. Much useful information of a general character receives attention, and the volume ends with elaborate tables giving the cubical contents of rooms of various areas and varying hights of ceilings. The intention of the author, Geo. D. Hoffman, has been to include in one volume everything necessary to save time and work in getting out all the data that may be needed for installing a system or for arriving at its cost. It represents a very great deal of work on his part and will be highly appreciated by the trade. Copies of the Compendium will be mailed free on application to the company.

Announcement is made by R. E. Goodrich and M. E. Goodrich, proprietors of the Electric Oil Stove Company, Homer, Mich., that they have sold the plant of the Electric Oil Stove Company to Lovell Smith, trustee. Mr. Smith also announces that he will operate the factory at Homer, but in order to expedite matters the office will be removed to Jackson, Mich., to which point correspondence pertaining to future business is to be addressed.

TRAVELING SALESMEN FOR 1900.

Terstegge, Gohmann & Co.

of Louisville, Ky., state that the following list of travelers will look after their interests in the territory indicated during the year 1900: Oliver Johnston will visit the trade in Eastern Indiana and Northeastern Kentucky: W. H. Cash in West Virginia, H. P. Moarncy in Eastern Kentucky and Southern Ohio, T. R. Bryan in Southwestern Kentucky and Southern Illinois, James Gillison in Southwestern Indiana and Northern Kentucky, James R. Crawford in Southern Indiana, Frank Schilling in Middle Indiana, J. J. Shuttleworth in Northern Indiana and Illinois, W. J. Handley in Southwestern Kentucky and Western Tennessee, A. H. Dunlap in Eastern Tennessee and Northern Alabama, J. Wilton Jones in New Orleans, La., and vicinity, C. M. Martin and A. J. Terstegge will look after the city trade, while W. J. Yager and B. H. Imorde will act as general salesmen.

Lovan Stove & Tinware Mfg. Company

of Springfield, Mo., will be represented on the road during 1900 by Charles Evertz, who will cover Southwestern Missouri and Southern Kansas; H. B. Cobban, who will visit the trade in Oklahoma Territory and the Indian Territory, and W. R. McCullough in Arkansas. The company announce that a little later they will put an additional man in a section of Kansas and Oklahoma Territory.

The Lawrence Odorless Hot Plates.

The Acme Gas Stove Company, Buffalo, N. Y., advise us that their Lawrence odorless gas heaters have met with so much approval during the past five years that they are now about to place on the market the Lawrence odorless hot plates in three sizes, finished in full nickel, white nickel or plain. In their Lawrence hot plates they have departed from the old line in offering to the trade an entirely new principle in hot plate construction, by which they say they overcome all odor. They place the burner in such a position as to obtain an extensive combustion chamber, which they mention from a sanitary standpoint is positively necessary.

The burner is inclosed in a polished steel drum having cast iron detachable bottom, so that all the heat is brought into direct contact with the cooking utensils. Air is supplied to the burner in the proper quantity to insure perfect combustion, thus overcoming all loss of heat and allowing a large body of cold air to come in contact with the gases while burning. Another point of advantage to which the manufacturers allude is the two-piece skeleton top. In this they use a separate center casting, which is removable, thus allowing the use of round bottom cooking utensils. Their experience during the past five years with their Lawrence odorless heaters was such that they do not hesitate to guarantee their goods and to reliable firms they offer to ship a sample heater or hot plate, freight prepaid, subject to the consignor's approval. If after a thorough test it is not found satisfactory it can be returned at the Acme Gas Stove Company's expense.

The O K Stove & Range Company,

with offices and salesrooms at 234 to 240 West Main street, Louisville, Ky., favor us with a copy of a 112-page catalogue which they have issued from the press, illustrating and describing various lines of O K stoves, ranges and heaters. In the arrangement of the matter attention is first given to the O K Jewel wrought steel range, embodying the modern features of construction and which is adapted for burning coal or wood as a fuel. Following this is the O K wrought steel laundry stove, made with two 8-inch holes in the top surface, and which will take an 8-inch oval wash boiler or a large square flat bottom boiler. Among their cast iron goods the manufacturers call special attention to the O K Crown range, intended for using coal only. This is embellished with the rococo style of ornamentation, has cut centers, heavy ring covers, round cornered sheet flue, heavy fire linings, large bailed ash pan, shaking and dumping grate and large U-shaped water box.

An entirely new line of coal cooks is the O K Jewel, which is referred to as thoroughly modern in style, design and ornamentation. It is made in several sizes, and in connection with the illustrations are to be found an enumeration of the special features of merit which the goods are claimed to possess. The O K Gem range is another attractive novelty, this being intended for burning wood only. The rococo ornamentation is supplemented with nickel trimmings, producing a very attractive appearance. Other goods to which special attention is invited include the O K King, a four-hole wood cook; the O K Queen, a member of the same class, and the O K Prince. The heaters are represented with the O K Winner in the leading place, this being a new air tight soft coal heater made in several styles and sizes. The O K Marvel, Success, Terror, Franklin, Burnsides, Royal and Mars are some of the other heaters illustrated and described in the catalogue before us. Several pages at the close are devoted to miscellaneous hollow ware, canopy grates, laundry stoves and instructions which are to be followed in order to secure the satisfactory operation of any cook stove or range.

ODD PLATES.

Every one who gets the 1900 calender issued by the Mississippi Valley Stove Company, Fulton, Ill., will be impressed by the beauty of the picture on the large card, which forms the principal part of it. This picture is a copy, by the chemigraph process, of the famous picture "Love on a Vacation," by Jean Aubert. Leaves for the months are attached to the lower part of the card.

The Patric Furnace Company, Springfield, Mass., have been incorporated for the purpose of manufacturing Heating Apparatus, with a capital of $40,000 by O. W. Rodgers, R. R. McGregor, A. S. Rodgers, C. F. Smith, R. H. Rodgers.

A combined diary and daily reminder, with a celluloid cover, was received from the Buckwalter Stove Company, Royersford, Pa., bearing in addition to their address the addresses of their sales agencies, which are E. R. Kurtz, 43 North Second street, Philadelphia, and Chicago Stove & Range Company, Twenty-sixth street and Armour avenue, Chicago. The diary also contains a greeting from the house, pictures of their Apollo Ranges, Ringgold Heater and the Eclipse Duplex Hot Air Furnace. Those who use this handsome daily reminder will be inspired with the belief that the Buckwalter Stove Company can supply their wants from the view of their large manufacturing plant, given on the last cover.

The Gobeille Pattern Company, Cleveland, Ohio, not content with displaying the artist's ability in their pattern work, find it impossible to send out any souvenir or trade literature that is not characterized by some touch of charm or beauty. A recent postal card, about as unpromising a thing as could be handled, is raised out of the commonplace by a classic decoration in yellows and blues and browns.

The Chicago & Erie Stove Works of Erie, Pa., are distributing a twentieth century greeting in the shape of a narrow poster bound at top and bottom with metal strips and calling attention to the Invincible and Helper Stoves and Ranges. The poster is embellished with a design in brilliant colors, representing an occupied automobile, and

bearing upon the dashboard the imprint, "New Honest Oak." This presumably refers to the heating Stove which is illustrated in the upper left hand corner of the poster. The leaves for the 12 months of the year are attached to the lower left hand corner of the poster, and there is also a leafiet carrying a yearly calendar. The make up is exceedingly neat and attractive.

The Youngstown Range & Stove Company, incorporated last year in Youngstown, Ohio, will build a plant in Hazelton, for the manufacture of stoves and ranges. The plant will be located on land adjoining the works of the Youngstown Iron & Steel Roofing Company, and the main building will be 100 x 50 feet and two stories high. The concern expect to occupy their new quarters about April 1. John O. Pew is president and general manager, and Mason Evans secretary and treasurer of the concern. Mr. Pierce, formerly with the Warren Range Company, has resigned his position with that concern and has been made superintendent of the Youngstown Stove & Range Company.

Two prominent members of the Western Stove trade, George D. Dana of St. Louis, and Chauncey H. Castle of Quincy, Ill., have been on the sick list for some time. Mr. Dana especially has been quite ill, but is now understood to be improving.

The Stove dealer who finds in his mail a yellow document, tied with red tape and further fastened with sealing wax, and bearing all the formalities of the most ominous legal document with which he was ever served, will probably find on opening it that the Michigan Stove Company have adopted that method of conveying an announcement of the name of their representative who will shortly make a call for the purpose of explaining what the company have to offer this year. As usual they have some surprises in store for the trade.

The staff of travelers of the S. Obermayer Company, Cincinnati, Ohio, and Chicago, Ill., manufacturers of Foundry Facings, Foundry Supplies and Equipments, for the year 1900 will consist as follows: W. J. Adams, representing the firm in Western States; Wm. Fitzpatrick in the Eastern States, Fred. J. Brunner in the Central States, W. A. Henderson in the Southern States, and Jas. E. Evans in Chicago and vicinity.

Harry King, who has many friends in the Stove and heating trade, is spending a short vacation in New York considering some propositions previous to making a connection for the year.

A dainty little folder with deep green covers has just been issued by the Pittsburgh Stove & Range Company with general offices and salesrooms at 610-612 Wood street, corner of Liberty street, Pittsburgh, Pa. One page is devoted to the name of the company and the trade-marks under which their Stoves, Ranges and Furnaces are manufactured; another page gives the location of the offices and salesrooms and tells where their foundries are located; another gives the *personnel* of the company, while still another is headed "Our Statement." This is to the effect that the Pittsburgh Stove & Range Company are not a "trust" and should not be classed as such. They are a chartered company, organized and operating under the laws of the State of Pennsylvania, and simply represent a consolidation of the Stove interests of Pittsburgh under one management for the purpose of eliminating the unnecessary expense incurred by individual management. The company desire it to be distinctly understood that no attempt will be made to charge more for their product than is legitimate and they realize that the trade would not be justified in paying more than the market price for their wares. The design of the front cover of the folder is in black and old gold, while the fourth page carries *fac-similes* of the various trade-marks under which the goods are manufactured.

Stove and Hardware Dealers.

Geo. A. Avery, dealer in Stoves, &c., Milford, N. H., who has been in business for the past ten years, has sold out to H. H. Barber of the same town, who will continue the business in addition to making it a department store.

The *Advocate*, Danville, Ky., recently published an interior view and a very complimentary description of the Stove, Hardware and Tinware establishment of George W. Chesnut in that city. After 17 years' experience with Bridgeford & Co., Louisville, Ky., Mr. Chesnut eight years since purchased the business, which he is now conducting, increasing the sales over 200 per cent. The view referred to shows a most attractively fitted store. It is finished in old oak, with a fine steel ceiling. The size of the room is 20 x 159 feet.

Mulligan & Davis, at Wells River, Vt., and also at Woodsville, N. H., across the Connecticut River, who have been in business for the past 23 years, have dissolved, Mulligan & Son taking the store and shop at Woodsville, while A. P. Davis assumes control of the old stand at Wells River.

The Saginaw Mfg. Company of Saginaw, Mich., have purchased the McCassy Brothers' Washboard factory at Cincinnati, Ohio. There is a report that this purchase is the preliminary to a consolidation in the Washboard manufacturing industry.

Clarence A. Brown of the firm of C. A. Brown & Co., Palmer, Mass., died on the morning of January 4 at his home on North Main street, after an illness of something more than a year. Mr. Brown was a native of Palmer, having been born April 20, 1850. He was educated in the Palmer schools and at Monson Academy. In 1871 he formed with his father the firm of C. A. Brown & Co., and engaged in the retail Stove and Hardware business, which was continued until the time of his death.

Milton Lebaw, Somerville, N. J., has purchased the Hardware business of J. M. Whitenack & Co., and has consolidated the entire business at the Whitenack store, 81 West Main street, where he has a large stock of Hardware, Stoves and Furnishings to meet the wants of the trade.

H. R. Ford has moved his Tin and Sheet Iron business from West Market street to Scales street, Reidsville, N. C. Mr. Ford asks the manufacturers and jobbers of Stoves, House Furnishing Goods, Tinware, &c., to send him catalogues and discount sheets, as he intends to carry a line of these goods in his new quarters.

In the Southern *Review of Commerce*, December 13, is a very complimentary article indorsing the "O H" Stove Pipe Elbows, manufactured by the Lawrence-Letts Elbow Company, Limited, Waverly, N. Y. This Stove Pipe Elbow, with which many of our readers are familiar, is a one-piece Elbow and possesses many advantages. Full particulars of sizes and prices can be obtained by addressing the Lawrence-Letts Elbow Company, Limited.

An ingenious arrangement to prevent overcrowding of stairways and elevators when entering or leaving a building is used in the main office of the International Correspondence schools, Scranton, Pa. The time of entering and leaving the building is regulated by clocks on each of the five floors. On the lower floors the clocks are set correctly, but on the upper floors they are a few minutes slow, so that the employees on the lower floors are at their desks before those on the upper floors are due at the building. In leaving the building the employees on the upper floors do not leave their desks until several minutes later than those on the lower floors. Over 500 people are employed in the building, which is used exclusively by the International Correspondence schools.

Enameling Cast Iron.*—I.

BY J. VOLLKOMMER.

The development of this art into a large and prosperous industry is of a comparatively recent date. Not so many years ago everything pertaining to the successful production of enameled iron ware was generally considered a trade secret, and jealously guarded by the manufacturers. Each firm had their own recipes for the preparation of enamels and their own way of applying the same. Yet in spite of all these precautions the general practice did not differ so very much in the several shops, and many claims as to the special merits of certain processes over others existed mainly in the imagination of their owners. The predecessor of the present enameler, like his brother in profession the old time glassmaker, with a few exceptions, contented himself in mastering only the mechanical difficulties of his trade. He did not inquire into the nature of enamel and glass, and how those chemical transformations took place, so long as he met with fairly good results. He believed implicitly in his formulas.

Improved methods in producing and working the iron in connection with the immense progress made by practical science, especially in chemistry, were instrumental in removing all mysteries enveloping the art of enameling and transforming it into an industry, based upon scientific principles.

THE NATURE OF ENAMELS.

In speaking of enamel, it will be well to remember that this term includes all chemical compounds of silica with two or more basic substances, smelted to a glass like mass and applied (either wet or dry) to metallic surfaces, so as to form a uniformly vitrified protective coat.

The silica enters into the composition in the shape of quarz or flint, the bases are the several compounds of potassium and sodium, such as potash, potassic carbonate, potassic nitrate or saltpeter, soda and common salt, or some alkali earths, such as certain kinds of clay, lime and others. The other chemicals used are of secondary importance; they supply coloring, gloss and opaqueness or regulate the melting temperature. The use enameled articles are intended for, the cost of the raw materials and of fuel, govern the composition of enamels, which may widely differ so long as the silica is in such a proportion to the alkali substances as to fuse them properly.

Apparatus used in chemical works are receptacles for acids require an enamel impervious to ordinary chemicals. For sanitary hollow ware, iron drain pipes and common sinks, cheapness of production has to be considered first, and any ordinary white enamel will do. In the manufacture of bathtubs, however, the aim is to obtain ware of a perfect white, high gloss and some durability against mechanical action. Enamels for decorative purposes ought to be prepared so that artistic effects may be obtained. The raw materials must be almost chemically pure, the fusing temperature low, so as to permit frequent firing; certain colors, also gold, requiring a special heat.

THE TREATMENT OF CAST IRON PRELIMINARY TO ENAMELING.

The proper treatment of the metallic surface insures the durability of the enamel: it prevents scaling from the castings. Cast iron is neither a uniform nor a pure chemical product, containing variable amounts of silicon and carbon. If melted cast iron cools slowly part of the carbon crystallizes out, but remains diffused through the metal in the form of small flakes of graphite. It is only loosely attached to the iron, and may be easily removed on fractures with metallic brushes. This variety of iron is known as dark gray cast iron. The same metal, if cooled rapidly, is crystalline in structure, contains little or no graphite, and all the carbon is chemically combined, forming what is termed white or light gray cast iron.

From experience we know that enamel will not adhere equally well to every kind of iron. Only surfaces consisting of the latter (light gray) variety are suitable for our purposes. There is, however, a serious objection to castings made entirely out of such iron. They are very hard and brittle, thus difficult to work with tools, are easily fractured, and owing to great internal stresses they frequently contain fissures and cracks. In order to obtain a casting suitable for enameling, and yet to some extent without the above mentioned defects, some foundries permit the molten metal to run into chilled molds. There it solidifies the quickest at the outside where the particles of iron touch the artificially cooled surface, while the inside of such a casting cools slower. A fragment of iron cast this way shows under a magnifying glass near its outside a crystalline structure of a whitish color and free of loose carbon, while its middle part consists of the ordinary dark gray iron, mingled with small particles of graphite. Experiments with castings from charcoal iron have proven, that this class of iron is especially suitable for enameling, being far better than the ordinary foundry pig iron.

Not only the quality of the metal, but also the form and proportion of castings influence successful results in enameling. The castings ought to be of the lightest possible kind, of a uniform thickness of metal throughout. Enamel invariably chips from places considerably thicker than the balance of the castings on account of its unequal expansion and contraction with the metal. Castings showing sand holes, cracks and other defects ought to be rejected, since enameling will not hide them. Small holes, after having been reamed, may be closed with plugs of copper, which, if carefully done, will not interfere with the adhesion of the enamel.

Castings as furnished by the foundry have a coat of facing (graphite, soapstone, &c.), which would form a layer between the metal and enamel. This coat must be removed before the casting is fit for enameling; since, like glass, enamel does not enter into a chemical union with iron; it merely adheres to the surface by means of the natural roughness of the latter.

CLEANING AND PICKLING.

The cleaning of castings from rust, dirt or mineral facings is done by hand, with wire brushes, or through the application of the sand blast, until a uniformly blank surface is obtained. This treatment is sufficient where the enamel is directly sifted over the metal, and no wet first coat or slush is used. Ordinarily, however, the superficially cleaned casting is subjected to a pickling process, which destroys all oxide or rust and produces a slightly rough surface, a very good base for the slush. The solution for this purpose consists of either muriatic (hydrochloric) or sulphuric acid, diluted in a proportion of 1 part of the commercial acid to 8 or 12 parts of water. It is kept in large wooden tanks lined with lead or carefully coated with pitch or varnish. Pickling rooms for medium and light castings may be arranged so that at the side of each acid tank there is another one filled with water for rinsing; next to it we find a scrubbing table and then a third tank, also containing water, for a final washing.

After several hours' exposure to acids the casting is rinsed in water, scrubbed blank, rinsed again and finally placed in a solution of hot soda water, where it remains for several minutes. After removal the hot water on its surface evaporates and the casting is ready for enameling. Soda water, aside from removing all traces of acid, protects the casting against further oxidation by covering it with a thin grayish film.

Bathtubs, after a superficial cleaning, are directly filled with the pickling acid, which is used over again, and afterward washed out with boiling soda water. Pickling rooms should be well ventilated and the use of iron in same for structural purposes avoided, since the

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acids destroy rapidly all iron roofing material, trusses, &c.

SLUSH OR FIRST COAT.

Some enamels, especially those containing considerable quantities of oxide of tin, may not be applied directly to the iron. The reducing action of the carbon in the metal will affect that oxide, discoloring it, and will also form carbonic gases, which occasion blisters and pin holes.

Slush or ground enamel is applied directly to the metallic surface, and serves as a separator between the iron and the surface enamels. Its expansion in heat should be between that of iron and glass, its composition such that it fuses completely only at comparatively very high temperatures. Slush is not supposed to melt onto the casting as a smooth glossy coat; it should form a half molten, rather rough and porous surface of uniform thickness, permitting a rapid expansion of the metal without separating from same. Slush is a mixture of silica, borax, feldspar, clay and some other chemicals of minor importance. These chemicals are carefully mixed and pulverized, then smelted and afterward ground; while in the mill some earthy substances (clay) are added with sufficient water to form a creamy fluid. Some manufacturers of ordinary iron hollow ware dispense with the fusing of their slush entirely and apply the thoroughly mixed raw materials. While with proper care a ware of good appearance may be thus obtained, it never possesses the durability and elasticity of that which received a properly smelted first coat.

There are no fixed rules governing the composition of enamels. Ground enamels contain a larger amount of silica and earthy substances than surface enamels.

So long as the weight of silica and other earths (clay, lime) is about equally balanced by that of the fluxes (soda, potash, borax, oxide of lead, &c.), an enamel can be obtained which will resist the action of water, weak acids and changes in temperature.

Below will be found a few compositions for a first coat on cast iron. The proportions given are general, permitting considerable variation. Each enameler should, through experiments, determine which is the most suitable mixture for his grade of iron.

GROUND A.

Quartz	25 to 30 parts
Borax	20 parts

Fritted, slowly cooled and ground with:

Quartz (feldspar can be substituted)	25 to 30 parts
Borax	20 parts

Added to the mill with sufficient water.

GROUND B.

Quartz	25 to 30 parts
Borax	15 to 16.5 parts
White lead	3.5 to 4 parts

Melted, cooled slowly and ground wet. Add to mill:

Feldspar	25 to 30 parts
Clay	20 to 25 parts

With sufficient water.

GROUND C, FOR CAST IRON.

Flint	11.20	Add to mill 8 to 10 per cent. of weight clay.
Borax	6.54 to 7	
Saltpeter	0.41	
Soda	2.85	
Fluorspar	3.93	
Oxide manganese	0.15	

GROUND D.

Quartz	30	Fused, add to every 40 parts of melted mass to mill.
Borax	16½	
White lead	3	

GROUND E.

Quartz	30	Fused, add to mill	Clay, 6 per cent, Carbonate of magnesia, 1 to 1½ per cent. of weight.
Feldspar	30		
Borax	25		

All castings are well heated before receiving their first coat. This precaution insures a more uniform layer by causing a more rapid evaporation of the moisture in the slush. thus preventing its dripping from the castings before the proper amount has adhered. This first application may be made by hand or some mechanical device, in the first case by dipping the articles or employing brushes of good size.

For bathtubs, sinks and similar castings large iron tables are frequently used, permitting a rotary (horizontal) and rocking motion. The piece to be enameled is placed upon them, partly filled with the liquid mixture, which, owing to the rocking motion of the table and the action of the centrifugal force, is spread all over the inner surface of the casting. A better way is the use of pneumatic enameling machines, acting like sprayers, in connection with the above mentioned rotary tables. Castings thus coated are placed in the drying room until burned in the muffle fire.

FUSING.

One kind of slush possesses a very high melting point, and is only intended to be fritted to the consistency of a soft dough. It is best fused in pots, or if tanks are more convenient, it should be placed in same on special receptacles of fire clay, since otherwise it will bake to the tiles of the tank, necessitating frequent repairs. While tank furnaces may not be found suitable for every kind of enamel or slush, they offer so many advantages, where large quantities are required, that pots are only used when certain high grade enamels of a particular color and composition are desired.

To get the greatest benefits from tank furnaces, like those of an almost similar construction employed in the glass industry, they should be equipped with a regenerative system of heating. It assures a uniform combustion of the greatest efficiency, free from smoke and dirt, and thus a better class product is obtained at the lowest price. Direct coal firing on the other hand always creates some smoke and other impurities, which are carried by the burning gases from the combustion chamber around and over the melting tanks and partly deposited in the latter, with the result that such enamel looses part of its gloss and purity of color. The sudden changes of atmosphere occasioned by frequently opening the furnace doors, as coal firing will require, cool certain inner parts unequally, and are responsible for many repairs.

Mixtures fused in small pots require more heat than those of the same composition fused in tanks in large quantities, and the necessary amount of flux differs slightly with the method employed in fusing. The several parts of muffle furnaces should be so proportioned as to suit best the work they are intended for. Furnaces used for burning in the enamel on heavy castings require muffles, which can carry loads up to 1 or more tons. The bottom tiles in such cases are very heavy and well arched, at intervals reinforced, and not only supported at the sides in the usual manner, but also at several points in the middle. When coal fuel is used it is well not to place the fire box directly underneath the muffle, but a short distance behind it, so that the burning gases develop their greatest heat when enveloping the bottom and sides of the muffle.

Continuous furnaces of a tunnel like construction, the ware entering at one end and leaving by the other, have been tried, but thus far have not been a great success, on account of the difficulties experienced in keeping them equally heated. There has been lately used in Germany an enameling furnace without muffle. It consists of two chambers, receiving the ware to be burned, which are alternately heated by means of a regenerative system. As soon as one of them has the required temperature the ware is placed in it, and by means of a valve the flow of gas stopped and directed into the other chamber. The stored up heat in the first chamber is sufficient to burn the ware. These twin chambers are thus alternately used.

In shops where heavy castings are enameled overhead trolleys will be found a very convenient method for conveying articles to and from the enameling tables to the different furnaces. By means of switches, connections can be made with every part of the shop. In front of the muffle furnaces the casting is taken up by well balanced forks or shears, which are suspended from the trolley, placed in the muffle, and after having been burned there, removed in the same manner.

Brooklyn Branch of Association of Master Plumbers of New York.

Cards of invitation are out for the annual entertainment and reception of the Brooklyn Branch of Association of Master Plumbers of the City of New York, to be held in Arion Hall, at Arion Place, near Broadway, Brooklyn, on Wednesday evening, January 17. The committee in charge hope to make this surpass all previous entertainments of the association. The entertainment will consist of a stage performance by well-known vaudeville artists of unquestioned ability. Immediately after the performance the floor will be cleared for dancing. The Entertainment Committee is composed of Edward Macdonald, Harry M. Noble, Eugene S. Kelly, William Eierman, John A. Ebel and Wm. J. Piercy, Jr.

Montreal Master Plumbers.

The Master Plumbers' Association of Montreal, Canada, held their annual meeting on December 28, when the following officers were elected to serve during the year 1900:

President, Captain Joseph Giroux.
Vice-President, George C. Denman.
Secretary, E. C. Mount.
Corresponding Secretaries, Edouard Brunet and J. W. Hughes.
Financial Secretary, James A. Sadler.
Treasurer, Thomas Moll.

The Master Plumbers of the Dominion of Canada will hold their annual convention in Montreal on July 1 next.

Jersey City Master Plumbers.

The Jersey City Master Plumbers' Association held its annual meeting Thursday evening, January 4, at Groschel's Hall, Oakland avenue and Beacon street, Jersey City, N. J., when the following officers were elected for the ensuing year:

President, F. Ewald.
First Vice-President, A. Becker.
Second Vice-President, J. Doran.
Third Vice-President, J. Donlon.
Recording Secretary, M. J. Moran.
Corresponding Secretary, N. Walthethun.
Financial Secretary, J. Sprouls.
Treasurer, W. J. Cross.
Trustees: T. Ellerton, J. Anderson and F. T. Kealleher.

The annual report of Treasurer Cross and Secretary Sprouls showed receipts of $559.38 and expenditures of $202.28, leaving a balance on hand of $357.10. After the business meeting the members held a social session in the lower hall, where a supper was served followed by a smoker, which were thoroughly enjoyed. Entertainment was afforded by singing and recitations and altogether a very pleasant evening was passed.

American Pipe & Foundry Company.

The American Pipe & Foundry Company have been formed by William G. Price, a former pipe manufacturer; Francis J. Torrance, treasurer of the Standard Mfg. Company; Charles A. Painter of the American Steel Hoop Company and Export Iron & Steel Company, and William B. Scaife of William B. Scaife & Sons Company, all of Pittsburgh, and soil and plumbers' pipe will be manufactured on a large scale. The capital of the company has been placed at $250,000, but it is the intention to develop the business into large proportions. The new company will take over the old works of the Berlin Iron & Lead Works, of the old William G. Price Company at Jeannette, remodel and improve them and place 250 men at work early in the new year. The new company will make at the start about 30 tons of soil and plumbers' pipe daily, the six sizes varying from 2 to 14 inches. It is expected that extensive additions and enlargements will be made during the next year and that the new concern will become one of the largest of their kind in the country. Mr. Price will be president of the new company. He formerly was actively engaged in the soil pipe business, operating the Jeannette works and a large plant on Smallman street, Pittsburgh.

FROZEN BOILER CONNECTIONS.

BY A LAYMAN.

This is the season of the year when an experience with frozen boiler connections that I have just passed through will be of interest to plumbers. I was passing the residence of a customer in returning from a job when the lady of the house called me in to see what it was best to do with the pipes, which she found were frozen, and she wished to avert a deluge when the thaw set in. The family had been away for the Christmas holidays and the house had been closed.

The water had not been turned off, because there was no stop cock on the supply pipe, and even if there had been the plumber had not connected the draw off pipe with the sink waste, as it should be, but had left a cock so the boiler could only be emptied by a bucketful at a time.

Well, the mercury in the kitchen was at 20 degrees, and I concluded the trouble anticipated by the lady would arrive before the thaw if the pipes between the water back and boiler were frozen. I went to them at once, and found on pressing them the creaking noise of cracking ice, which showed that a heavy fire would soon make trouble, so I checked the fire to give me time to think. The fire was not as yet strong enough to make trouble, and I kept it as much as I could away from the water front. By more careful examination I found that the pipes were frozen solid; and on sounding the boiler with a hammer it seemed to be frozen solid also, but in the absence of any bulge I concluded that the center still contained unfrozen water.

I knew that when the fire thawed out the water back there would be an expansion that would wreck it, and was certain that if it held till steam was generated there would be an explosion that would change the style of the kitchen, and possibly the back of the house, unless some relief was afforded. I concluded if a vent was provided for the escape of water or steam there would be no trouble, so I loosened the top coupling at the water front and the side coupling at the boiler and set a dish-pan and a bucket to catch the water that I expected to escape. In about ten minutes the water came, as expected, and a little later, as the fire did its work, the expected steam arrived, and then some thumping and plenty of noise, which continued for several minutes. The woman was scared and wanted me to adjourn to a safer place, but I was deeply interested in what was going on right there, so I had the kitchen to myself most of the time, with a cordial invitation to get out before it was too late if there was going to be serious trouble.

Now I didn't want that water front to get short of its water supply, for being my first experience with such a case I wanted to see it out to the end, so I stayed right there watching, thinking and listening. I felt sure if the water front once got empty and then water rushed in there would be an explosion, which was the very thing I didn't want to happen while I was there. The pipe to the side of the boiler was hot all the way, and giving out plenty of steam, and though the steam might not amount to much water, I wanted it all inside, so I tightened up the coupling, but not enough to entirely stop the escape, which was acting as a safety valve. This increased the music and had the effect of warming the lower pipe some distance, and I concluded if this pipe was open I would be sure of a water supply and there would be no explosion.

My sporting blood was circulating and I was playing against that explosion with an interest that was de-

cidedly exhilarating. I saw a one-burner small gas cooking stove, with hose connected to a gas cock, that I could shove in under the boiler and let it rest on the boiler stand, and I soon had a gas flame against the bottom of the boiler. It was not a great while before my conclusion that the boiler was not frozen solid was demonstrated to be correct, for while there was a continual mild banging going on in the water back and upper pipe there was a startling racket when the lower pipe and the bottom of the boiler was cleared of ice and an ample supply of water was let into the water back.

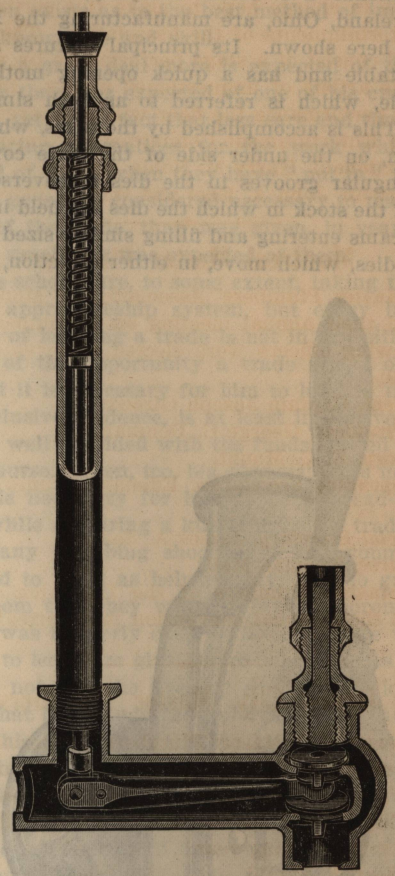
I had expected this, but was a little surprised at the duration of the noise, which I concluded was due to the fact that the water back was making plenty of steam, but that the steam had not yet penetrated the casing of ice on the inside of the boiler. The water supply, however, forced the steam up against that ice noisily for a few minutes, while the lady caustically informed me that she had not invited me to commit suicide, and peremptorily ordered me to seek safety in departure. It may have been impolite in me, but I was so busy with ice, water, steam and fire that I just stared at her, and I now remember that she made it a stand off by glaring at me.

In the meantime the steam had penetrated the ice casing inside of the boiler and the noise stopped. I immediately put my hand on both pipes and found the lower one, which had been lukewarm, was now ice cold and the upper one, which had been intensely hot, was now so cool that I could hold my hand on it. Then I knew that the explosion was indefinitely postponed and that a natural and safe circulation was set up, so I screwed the couplings up tight. I tried the boiler with a hammer and it still sounded solid, and it continued to sound so for some time. The sink faucets and pipes were still frozen, and I drew some water from the draw off cock in a tea kettle and heated it and poured it over the pipes and soon had them running. I found the sink trap frozen so the water would not run off, and by putting a cloth wet with hot water on it the water soon ran out of the sink. The kitchen now began to get warmer, and I got ready to leave. On emptying the bucket under the water back coupling I found that a little more than a quart of water had escaped.

Taking it all in all there had been very little trouble in getting rid of the ice and getting everything into working order, where there would undoubtedly have been a wreck and very likely a serious explosion if a vent had not been provided for the escape of steam and to prevent the development of a heavy pressure.

Thermostat for Natural Gas Valves.

In the accompanying illustration we show a thermostat to regulate temperatures in rooms or buildings using natural gas for a fuel by opening or closing the gas supply valve as the temperature rises or lowers. The thermostat is manufactured by Langsenkamp Brothers' Brass Works, Indianapolis, Ind. Its operation involves the expansion and contraction of the material of which it is made. It is furnished in both nickel and ebony finish, or in cheaper finish where cost is an item for consideration. It contains a balanced valve with an opening having double the area of an ordinary stove valve. The valve, it is claimed, is so constructed that it is not affected by change in pressure and does not obstruct the flow of gas. It can be opened or closed by a common gas key, but is always automatic in operation when open. All parts are made to be perfectly balanced so as to work freely and none of the automatic parts work through packing to make friction. The upright expansion tube is made of a composition which is said to be very sensitive to heat and cold, and which can be set by means of a thumb screw at the top of the tube to maintain any desired degree of temperature. It is pointed out that this valve has met the approval of insurance companies, inasmuch as a rising pressure in the gas mains instead of causing an excessively large amount of gas to be burned and a correspondingly intense heat to be generated, the valves close against the pressure as soon as the increased amount of gas burned raises the temperature in the room. It is claimed that by maintaining a uniform temperature a saving of gas is effected which will in a short time amount to more than the cost of the valve. A by-pass is provided to keep a pilot light burning. The valve is made in sizes from 1 inch to 1½ inches, inclusive. It is pointed out that where meters are used for measuring the gas consumed the thermostat has been found to effect a substantial saving.



Thermostat for Natural Gas Valves.

Unsanitary Manila.

To a recent issue of the *Record and Guide* F. B. Hinchman contributes a valuable article on building methods in the Philippine Islands, from which we reprint the following on sanitation:

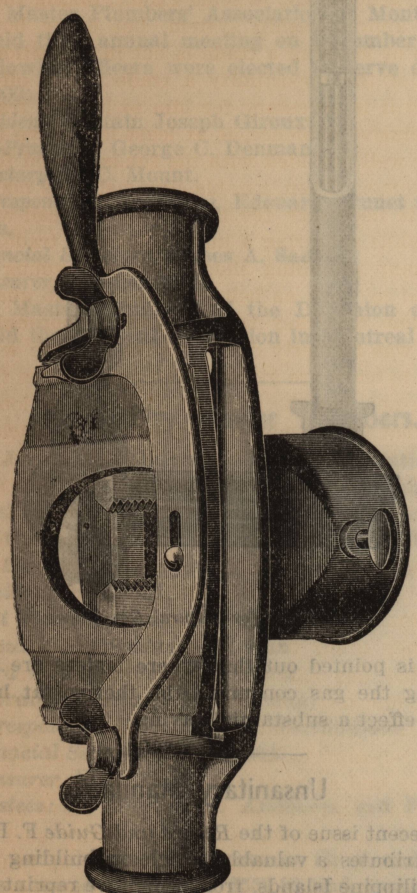
Plumbing from the American standpoint is an unknown art. A few buildings owned by Spaniards or Englishmen have out of date washout closets improperly connected and unvented, but this is a great improvement on the average arrangement, which consists of an antique pan closet or more often of a hole leading most any old place! A few of the main streets have been sewered after a fashion by means of a brick arched, flat-bottomed canal. Where the street had even this arrangement a similar canal was constructed under the house and connected to the public sewer. In most cases, however a private cesspool was located somewhere on the premises, while in the outlying bamboo districts, particularly the tough Tondo district, anything or nothing was provided. The lack of proper sanitation is undoubtedly the cause of much of the fever and the always prevalent small-pox.

With all these adverse conditions the salvation of Manila as a habitable city is the water supply. All parts of the city and even outlying districts are supplied with fairly good water brought in through cast iron mains from a pumping station 12 miles away on the river at San Tolan. All regularly constructed houses are piped, and public hydrants are provided at intervals at the curb

for the use of the general public. Fire hydrants are also found at intervals, but the supply is hardly adequate for this extra call, and the engines (such as they are) are often forced to run lines to the neighboring streams and tideways.

National Die Stock.

The National Die Stock Company, 972 Hamilton street, Cleveland, Ohio, are manufacturing the National Die Stock here shown. Its principal features are that it is adjustable and has a quick opening motion to a two-part die, which is referred to as both simple and effective. This is accomplished by the cams, which take the V form, on the under side of the plate cover, and move in angular grooves in the dies transversely over the body of the stock in which the dies are held in sliding ways, the cams entering and filling similar sized slots, in the top of dies, which move, in either direction, to close



National Die Stock.

or open along their lateral ways. For convenience the plate is moved by a handle, as shown in cut, and a thumb screw binds it and the plate at the desired point. This point can be fixed by an adjusting screw on the side of the stock; size desired and standard is marked. It is observed that in cutting large pipe, to ease the operator the handle can be set for a light cut first, afterward slacking the screw and going back a few threads the handle can be closed to standard and the cutting finished, making it easier for the operator. In this way the thread is not lost, and when done the dies can be opened and the stock lifted off without having to back off and endanger the thread. The manufacturers say that with this stock a 4-inch pipe can thus be threaded easier than a 2-inch pipe with solid die. The die motion is always central and both dies cut alike. Changing dies is done quickly, the stock is light, strong and easily handled, and the dies cannot be misplaced.

The Crane Company of Chicago are shipping Pipe and Malleable Fittings to Hawaii, Mexico, France and the Philippines.

THE AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS.

Preparations are about complete for the annual meeting of the American Society of Heating and Ventilating Engineers, and it is expected that the meeting will be of unusual interest. Papers have been prepared by R. C. Carpenter, H. Eisert, A. A. Cary, John Gormly and James Mackay. The papers of Messrs. Carpenter and Eisert are on the use of fans, Mr. Cary's paper on a dust exhaust system, Mr. Gormly's paper on "Dangerous Air Ducts" and Mr. Mackay's paper on the "Rating of Steam and Hot Water Boilers for Heating Buildings." As this subject has been discussed and a plan adopted by the Carbon Club, its members have been invited to attend the society's meeting and hear the paper and the discussion of it. Another attraction at this meeting is the invitation of John W. Jackson, chief engineer of the Park Row Building, to visit the building and examine its heating, ventilating, electrical and mechanical equipment on Wednesday the 24th, between 10.30 and 12 o'clock.

The Carbon Club.

The next meeting of the Carbon Club will be held in New York on January 26, at the Murray Hill Hotel. James Mackay of the Kellogg-Mackay-Cameron Company, Chicago, a member of the club, is also a member of the American Society of Heating and Ventilating Engineers, and will read a paper before the society on "Rating Steam and Hot Water Boilers for Heating Buildings." In consequence the meeting of the Carbon Club instead of being held on the third Monday of the month, as is customary, has been set for the date mentioned so that the members of the club, who have all been invited, may attend the meeting of the society and hear this paper and any discussion it may bring out.

An Art Casting.

There is on exhibition in the salesroom of the American Radiator Company, at 42-44 West Twentieth street, New York, a casting which is 2 feet wide and 5 feet 6 inches long. It is attractive and interesting alike to the practical foundryman and the lover of art. It is notable in a casting of this size in being remarkably true and flat and free from warping out of shape. The background is perfectly smooth, and brings out the design to the best advantage. In the center is a shield, at each side of which is a winged Cupid supporting the shield by means of a leaf scroll design which extends beyond the figures at each side and is remarkable for the sharpness of its lines and their trueness. The whole work shows that it is just as it was taken from the sand without any special finish, and is a handsome piece of the molder's art. The leaf scroll design is somewhat of the same style as used by the company in their Verona radiator, and is an evidence that those who desire radiators of highly artistic design and perfect finish have only to place their orders with the company to have their wishes gratified.

New York City Notes.

The Manhattan Branch of the New York Master Plumbers' Association will hold its regular meeting next Tuesday evening in its rooms, 155 East Fifty-eighth street, New York, when the newly elected officers will be installed.

There have been some differences of opinion as to whether master plumbers in New York City are required to register with the Board of Health under the new building code. After a consultation between a committee of the master plumbers and their counsel, Mr. O'Connor, and Corporation Counsel Steinert of the Board of Health, Mr. Steinert gave it as his opinion that it was

necessary for master plumbers to register in the Board of Health. Plumbers not doing this in New York City have no standing in the courts. There will probably be an effort to repeal this section of the law, as the plumbing is all out of the hands of the board.

The Department of Buildings is hard at work on the new rules and regulations and expects to have them in print in a few days.

Blake Combination Pipe Vises.

Prentiss Vise Company, 44 Barclay street, New York, have just added to their line of vises the Blake pipe vise here illustrated. Fig. 1 shows the heavier pattern, made

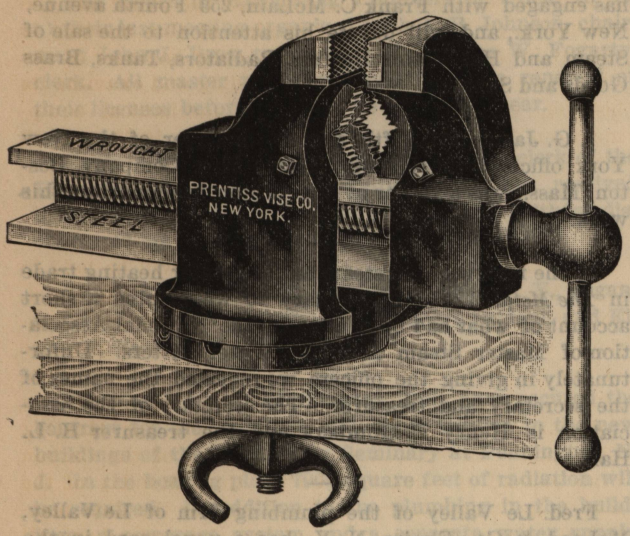


Fig 1.—Blake Combination Pipe Vise.

with a wrought steel channel arm to stand hard usage. This vise is extra strong and combines the ordinary features of such a tool with reversible jaws for holding pipe. The swivel base is guaranteed not to slip. No. 183 has 6-

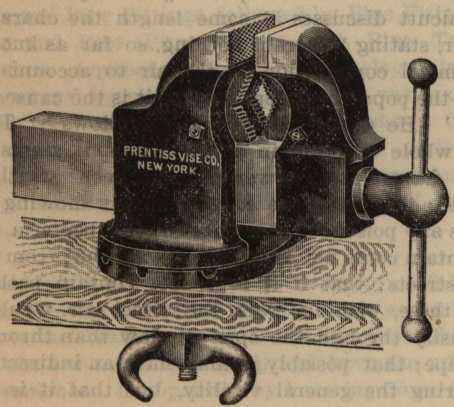


Fig. 2.—Similar Vise for Smaller Pipe.

inch jaws, holds ⅛ to 6 inch pipe, and weighs 155 pounds. No. 185 has 7-inch jaws, holds ⅛ to 8 inch pipe, and weighs 240 pounds. Fig. 2 is a similar vise with extra strong arm, No. 181 having 3½-inch jaws with a pipe capacity of ⅛ to 2½ inches, weight 53 pounds, and No. 182 4¼-inch jaws, ⅛ to 3 inch pipe, and weight 75 pounds. The manufacturers refer to the exceptional strength of these vises.

It is rumored that another movement is on foot for the formation of a Sewer Pipe combination. The project, it is said, will be promoted on a considerably smaller and more conservative scale than the Federal Sewer Pipe Company, who were started last year with a proposed capital of $27,000,000. In the new enterprise it is contemplated to include only the largest concerns in the business and to get the manufacturers themselves to take the large bulk of the stock.

THE PLUMBER'S APPRENTICE.

BY OBSERVER.

A great deal has been spoken and written on the apprenticeship question, not only in connection with the plumbing trade, but nearly every other trade as well. While every one concedes the necessity of young men being taught the mysteries of a trade, a wide difference of opinion exists as to the best method of imparting the desired knowledge and skill.

While a great deal more is expected of the plumber of to-day than was expected of one of his craft in years gone by, yet it is a fact that less care and time are given to preparing apprentices for the work which will be expected of them, when they have "put in" the number of years generally considered necessary to master all the details of the trade, than was given, in years gone by, when so much less was expected of them.

Trade schools are, to some extent, taking the place of the old apprenticeship system, but every boy who is desirous of learning a trade is not in a position to avail himself of the opportunity a trade school offers. The fact that it is necessary for him to learn a trade, while not conclusive evidence, is at least indicative that he is not over well provided with the funds needed for a trade school course. Then, too, his circumstances may be such that it is necessary for him to be a bread-winner for others while acquiring a knowledge of a trade.

In many plumbing shops boys and young men are employed to work as helpers only, and no guarantee is given them that they will be given a thorough instruction, as was formerly done. Those who are willing and anxious to learn are given more opportunities than those who are not, but the average employer no longer cares to feel that he is under any obligation to teach a young man in his employ all that he himself knows. This is not to be wondered at, especially in country towns, where the young plumber, after acquiring a thorough knowledge of the business and an acquaintanceship which he considers will be of advantage to him, is apt to "set up" for himself in the same town and become a competitor of his former employer.

Another thing that employers complain of is that, after a boy has acquired enough skill to be of some use to his employer, and can in that way reimburse him for the time and trouble he has taken to teach him, he (the boy) begins to have inflated ideas of his own importance; and as most boys of to-day object to any, except verbal contracts, he feels free to leave any time he thinks his professional skill will justify such a move. The employer is, no doubt, frequently at fault; but a young man who is learning a trade or profession should remember that the knowledge he is acquiring is worth some sacrifice on his part; and if he does not consider it of enough importance to be willing to undergo some hardships in order to obtain it, then he need never expect to make a success in that line. It looks very much as if the solution of the apprenticeship question depended very largely on the apprentice himself.

At the annual meeting of the stockholders of the Michigan Heater Company, held on Monday evening, January 8, the following Board of Directors was elected for the ensuing year: H. D. Keller, T. E. Robinson, F. Zannoth, M. J. Keller and H. Brehm. The directors elected the following officers: President and general manager, H. D. Keller; vice-president, Frank Zannoth; secretary and treasurer, Thos. E. Robinson. The retiring secretary, Rob't Law, Jr., was presented with a gold headed umbrella suitably inscribed as a token of the appreciation of his services by the company. The new plant of this company is rapidly approaching completion and the entire plant will be in running operation on January 15. We are advised that enough orders are on file to keep the foundry working to its fullest capacity for the next six months.

Heating and Plumbing Notes.

The Chicago Master Plumbers' Association, at their regular meeting December 26, elected the following list of officers for the ensuing year: President, Charles C. Breyer; vice-president, M. J. Carboy; secretary, Samuel Smith; treasurer, C. J. Herbert; sergeant-at-arms, J. W. Brunt; Executive Committee, the foregoing with C. J. Boyd, Edward O'Shea, Joseph P. Heeney and David Whiteford.

Wm. H. Erringer, 174 Division street, Chelsea, Mass., who used the room over his plumbing shop as a bed chamber, was burned to death on January 5 in a fire that destroyed the building. Mr. Erringer was 34 years of age and a native of Kentucky.

At the annual meeting of the Supervising Board of Plumbers and Plumbing of Buffalo, N. Y., Joseph Irr was re-elected chairman and J. Ebbs elected secretary.

The Callahan Supply Company, Worcester, Mass., in form us that they are continuing the improvements at their recently occupied quarters at 30 and 34 Foster street and have a well arranged stock of Plumbing Fixtures, Goods and Supplies. They are making a special feature of their showroom, so that fine Plumbing Goods can be seen and examined. With the location, warehouse, stock and shipping facilities they are enabled to make prompt shipments.

Cooper & Cole Bros., Lincoln, Neb., dealers in Plumbers' Supplies, Pumps, Tanks and Wind Mills, report that they have enjoyed an increase of 25 per cent. in their sales for the past year. The company now employ 12 men and three traveling salesmen and do business in Nebraska, Kansas, Eastern Colorado, Wyoming, South Dakota and Montana, besides reaching into Iowa on some special articles. The company have recently purchased a building of their own just south of their present location on South Tenth street and will move therein as soon as arrangements can be made.

W. K. Robbins, a plumber of Manchester, N. H., and secretary of the Board of Health, has been authorized by the committee on rules of the State Board of Health to draw up rules for the examination of applicants for plumbers' licenses.

A four-page circular received from Huebel & Manger, 288 Graham street, Brooklyn, N. Y., is devoted to a fine line of Bathroom Specialties, including Soap Cups, Sponge Racks, Towel Bars and a variety of Nickel Plated Fittings for residence and public bath and toilet rooms.

George E. Drescher of Buffalo, N. Y., was severely burned in endeavoring to save some goods from a fire which destroyed his plumbing shop on January 3.

The Alexander Furnace & Mfg. Company of Lansing, Mich., inform us that they have made substantial improvements in their Cline Automatic Acetylene Gas Lighting Machine during the year, so that it now operates and controls the supply of water without a valve or any other working device, which is considered a great point in its favor.

Foster & Co., Lisbon Falls, Maine, are, it is reported, about to make a proposition to the authorities for lighting the village with acetylene. They have been operating an acetylene light plant in their building and lighting several stores near by for several months.

The 1900 calendar distributed by the Wm. McShane Company, 711 Sixth avenue, New York, which is the up town branch of the Colwell Lead Company, is of a vividly patriotic complexion. The center of the card shows a view of the U. S. S. "Olympia" entering New York Harbor, with the statue of Liberty well in the foreground A medallion portrait of Admiral Dewey hangs above. The scene is bordered by an elaborate design, including the Bird of Freedom and shields of the national colors. On either side stand representatives of the United States Army and Navy, surrounded by various implements of warfare. The whole is excellently printed in colors.

The Boston Steam Specialty Company, 35 Hartford street, Boston, Mass., announce their incorporation, with F. H. Plouff as president and John A. Emery treasurer, for the purpose of selling Steam Specialties. Their line includes Engines, Boilers, Pipe, Fittings, Valves and a general line of Standard Supplies.

F. E. Phelps, who is well known to the heating trade, has engaged with Frank C. McLain, 253 Fourth avenue, New York., and will devote his attention to the sale of Steam and Hot Water Heaters, Radiators, Tanks, Brass Goods and Supplies.

I. G. James, 111 Fifth avenue, manager of the New York office of the Gurney Heater Mfg. Company, Boston, Mass., was a visitor at the Boston headquarters this week.

In the review of the steam and hot water heating trade in *The Metal Worker* of January 26 we printed a short account of what had been done by the National Association of Master Steam and Hot Water Fitters. Unfortunately in giving the officers we reversed the names of the secretary and treasurer. The secretary of the association is Henry B. Gombers and the treasurer H. L. Hall.

Fred. Le Valley of the plumbing firm of Le Valley, McLeod & Co., Elmira, N. Y., has a novel card in the Elmira *Daily Gazette* January 6, in which he announces that bids will be received for one dress suit. The firm's advertisement on the same page shows what Mr. Le Valley's business is.

In an article in *Municipal Engineering* Dr. Leonard P. Kunnicutt discusses at some length the character of sewer air, stating "there is nothing, so far as known, in the chemical composition of the air to account in any way for the popular conception that it is the cause of any disease." He closes his article as follows: "To sum up the whole question in a few words, it seems to me that the danger from sewer gas has been greatly over estimated; that there are no experiments showing that it contains any poisonous gas; that the few bacteria that it does contain come not from the sewage but from the air of the streets; that if it ever does contain pathogenic germs, these, coming from the street air, would come more easily through the open window than through the drain pipe; that possibly it may have an indirect action in lowering the general vitality, but that it is almost inconceivable how any amount of the sewer air could be forced from the main sewer into the air of dwelling rooms."

The plumbers of Janesville, Wis., have refused to connect bathtubs and other plumbing materials and fixtures that are not purchased of local dealers.

Thieves have been robbing some of the fine residences in the vicinity of Central Park, New York City, of their plumbing fixtures and gas fixtures. The residence of the Hon. Levi P. Morton is one of those robbed that has been reported to the police.

J. B. Carroll, 84 Market street, Chicago, Ill., has issued a little book on the question of Burners, which is of special interest to all who use and sell acetylene lighting apparatus. It is devoted to the Hahn Burner, which is said to burn with a pure white disk with no black spot in the center, and it does not carbonize.

The Journeyman Steam & Hot Water Fitters' Association of Philadelphia have notified the employees of the adoption of a new scale of wages at 40 cents an hour with an eight-hour day, to go into effect May 15.

The Hart & Crouse Company, Utica, N. Y., have secured the necessary space and made all the arrangements for a fine exhibit of their Royal Steam and Hot Water Heating Apparatus at the Paris Exposition.

L. B. Sherman has established himself at 62 Grand street, New York, and is prepared to furnish heating contractors with Boilers, Radiators, Valves, Tanks and Supplies.

The Board of Examining Plumbers of Utica, N. Y., at their last meeting organized with A. B. Johnson, chairman; John J. Droz, treasurer, and Thomas W. Fogarty, clerk. All master plumbers must obtain a renewal of their licenses before they can do work this year.

Captain Frank Bauder, who was formerly clerk of the Plumbing Board of Schenectady, N. Y., has received a resolution of thanks for the efficient and faithful discharge of his duties while clerk of the board.

The Plumbing Board of Poughkeepsie, N. Y., organized on January 4 with Peter Adriance, president, and Elmer E. Eastmead, secretary.

Traynor & Co. of Wilmington, Del., have secured the contract for the plumbing and steam heating in the new buildings of the Pennington Seminary at Pennington, N. J. In the heating plant 7000 square feet of radiation will be required. In addition to the plumbing in the buildings, a sewerage system and a separate water supply and fire protective system will be provided.

A 96-page catalogue is received from Brown & Wales, 69-83 Purchase street, Boston, Mass., relating to Steam Fitters', Gas Fitters' and Plumbers' Supplies. The first few pages are devoted to Wrought Iron Pipe, Radiator Valves and Pipe Fittings, followed by Pipe Fitters' Vises, Stocks and Dies, Pipe Cutters and Pipe Tongs and Wrenches. Another section of the catalogue is devoted to Plumbers' Brass Goods, showing the various kinds of Bibbs and Stops. The catalogue also shows Cast Iron Lavatories, Bathtubs of different styles, various kinds of Water Closets with plumbers' wood work, and closes with a variety of Pipe Holders and Lead and Brass Traps.

The Mosely Folding Bathtub Company, 358 Dearborn street, Chicago, are sending to the trade a catalogue devoted to their various styles of Folding Bathtubs. These Bathtubs are made to fold up and have the appearance of a wardrobe. On opening, by lowering down the front, a convenient Bathtub is brought to view. They also provide for use in connection with the Tub an instantaneous water heater, which may be operated by gas, oil or gasoline for heating the water required for a bath. Some of the Tubs are furnished with wheels, so that they can be readily moved from one apartment to another. They are also provided with a hose connection, so that the water used may be run off conveniently.

New Firms and Changes.

Acme Mfg. Company, Somerville, Mass., have been incorporated to manufacture and sell Plumbers' Materials with a capital of $5000 by H. E. Folger, H. C. Folger and F. P. Hughes.

The Mercer-Ziesse Heating & Plumbing Works are a new concern who have just been established at 83 and 85 Pearl street, Grand Rapids, Mich. The business will be conducted by W. F. Mercer and J. A. Ziesse, both of whom have been in the employ of Sproul & McGurrin for ten years.

Ellis Marine Plumbing Company, 32 Broadway, New York, have been incorporated to do marine plumbing with a capital of $20,000 by T. F. Gaynor, H. M. Westcott and A. C. Patterson, all of New York City.

Donahue & McCormick are a new firm who have leased the building 800 Broadway, Albany, N. Y., and will engage in the plumbing and roofing business. The firm will also carry a full line of Stoves and Ranges.

Harvard Heating & Ventilating Company of New York City have been incorporated with a capital of $5000 by Charles H. Bertholf of Yonkers, Theodore l'Hommedieu and John K. l'Hommedieu of Great Neck.

The Acme Mfg. Company of Somerville, Mass., have been incorporated for the manufacture and sale of Plumbers' Supplies, of steam, gas and electric plants, and to quarry all kinds of Stone and Minerals, with a capital stock of $5000, with H. E. Folger president and H. C. Folger treasurer.

The R. C. McClure Company, Syracuse, N. Y., were incorporated January 5 to manufacture and sell Hardware, Boilers and Plumbers' Supplies. The capital is $50,000 and the directors are Robert C. McClure, John McClure Chase and John H. Costello.

Cincinnati Stamping Company,

Walnut, Canal and Clay streets, Cincinnati, Ohio, have issued a new illustrated catalogue of 140 pages, showing their line of japanned, plain and stamped tinware and sheet metal specialties. The book is 7½ x 5½ inches in size, printed in dark blue ink, with a red paper cover. Views of the exterior of the company's factory and of the stamping and tinware departments are given at the beginning, and an index of the contents occupies the three last pages. Twenty-two pages are devoted to japanned ware, including bread and cake boxes, cash boxes, spice and sugar boxes, buckets, comb cases, coffee and tea caddies, candlesticks, oil and gasoline cans, coolers, cuspidors, trays, sprinklers, toilet sets, baths and coal vases. In the next 20 pages are shown pieced tinware, such as boilers, buckets, milk cans, oil cans, cups, dippers, funnels, measures, coffee and tea pots, saucepans, steamers, &c., special mention being made of the Robinson steam cooker and the Robinson Precious coffee pot, which are specialties of the concern's manufacture. Following are 20 pages of stamped tinware, embracing all the staple articles in this line, such as boilers, bowls, cullenders, dippers, ladles, kettles, molds, pans and such like. Galvanized ware, including buckets, ash cans, oil cans, tubs, sprinklers, occupy the next place, followed by copper ware in wash boilers, tea kettles, tea and coffee pots, measures and funnels and various kinds of spoons.

A miscellaneous section takes in egg beaters, stove boards, sad irons, mincing knives, lanterns, oilers, sieves and sifters, together with a long line of wire goods, including broilers, dish ovens, potato mashers, clothes lines, corn poppers, toasters, conductor strainers, fly traps, &c. Sheet iron ware occupies ten pages, and embraces elbows, stove pipe, fry pans, roasters, broilers, shovels, coal hods, &c., followed by stove hollow ware and enameled ware. The last 30 pages are devoted to tinners' trimmings and roofers' supplies, in which are embraced dampers, cut offs, conductor elbows, eave trough hangers, thimbles, rivets, galvanized pipe and gutter, together with Regan's patent metallic shingles, of which the company are the sole manufacturers. They also carry stocks of roofing plates, black and galvanized sheets, sheet zinc and copper, solder and tinners' tools and machines.

The E. W. Bliss Company of Brooklyn were omitted from the list of exhibitors at the Paris Exposition. They have secured 560 square feet at Vincennes and 288 square feet at the Champ de Mars.

A FINE ENAMELED WARE PLANT.

For some time prior to the beginning of last year it had become increasingly evident to the Lalance & Grosjean Mfg. Company of New York that their manufacturing capacity for enameled ware at the big factory at Woodhaven, L. I., immense as it is, was becoming totally inadequate to meet the rapid growth in the demand for this class of goods. The revival of prosperity throughout this country and the expansion of their trade in foreign markets called for a constantly increasing supply of the company's enameled wares, until, at the beginning of last year, they were confronted with the positive necessity for a radical and prompt extension of their facilities for production, if they were to cope in any satisfactory degree with the current requirements of their customers. Consequently it was decided that an entirely new factory, to be devoted exclusively to the manufacture of enameled ware, should be erected on the block immediately adjoining the company's large group of factory buildings on the east side.

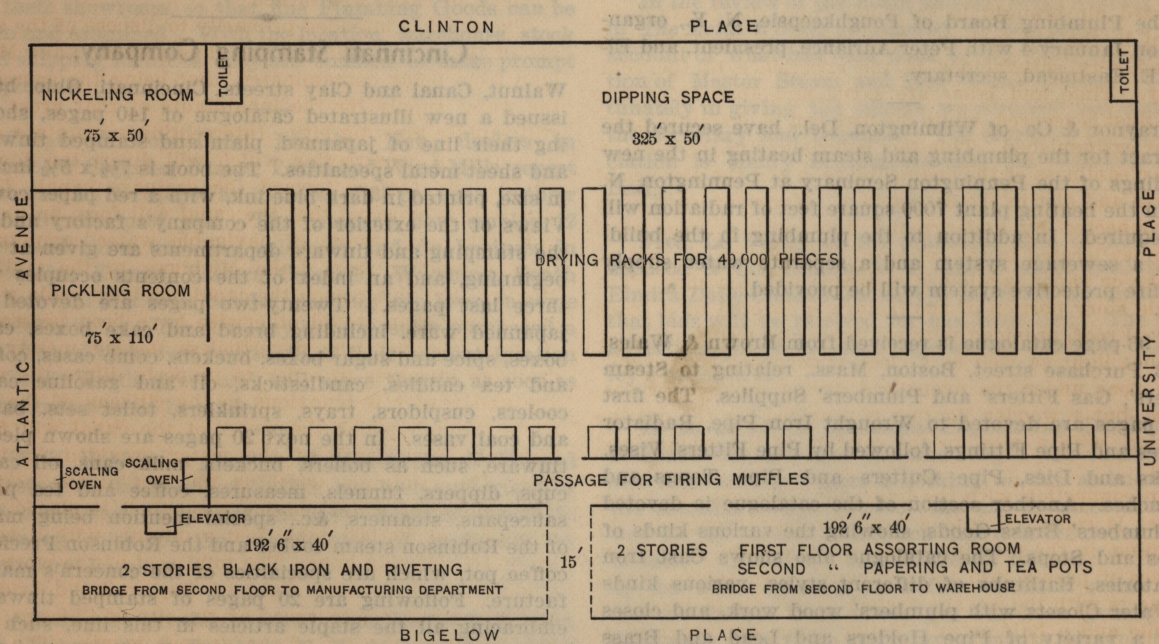
The contract for the new buildings was given out in the middle of March, and the work on them began forthwith and was pushed actively until, at the end of October, the factory was in a condition for the inauguration of operations. While not yet entirely completed, so far as the equipment of ovens is concerned, the establishment has been for the past two months in steady operation, each week seeing a larger volume of output. Before the end of the current month it will be in full work, giving the Lalance & Grosjean Mfg. Company a potential producing capacity of 125,000 pieces of enameled ware a day.

The new building, of which the ground plan is presented herewith, occupies an area of 200 x 400 feet, continuing the company's immense establishment so that it now covers a total space 1200 x 400 feet, lying parallel to the tracks of the Long Island Railroad. At the west end the building is carried up three stories over a space 40 x 400 feet, the remainder of the structure, 160 x 400 feet, being of one story. The entire building is of brick, with steel frame work, and is made as nearly fire proof as possible. The two upper stories at the west end of the structure are connected with the main building adjoining by two double covered bridges, one at either end. These bridges are of metal construction, the sides and roofs being of corrugated sheet iron. Through the bridges at the north end are brought in, on light trucks, the black iron articles which have been stamped and formed up on the corresponding floors of the old factory. These are stored on the second and third floors until needed for treatment in the enameling shop below. After passing through all the processes necessary for transforming them into enameled ware, they are sent out into the assorting and packing rooms in the old factory over the bridges at the south end of the building. Two elevators, operated by hydraulic power and located one at either end of the building, serve to carry the unfinished ware down and the finished goods up. The system followed throughout the factory is progressive; no back steps are taken by the goods in the process of manufacture. They come in as black iron articles at one end, go forward through the several processes, and emerge at the other end as finished enameled ware, ready for boxing and shipment. On the second floor, along the outer wall, is a row of benches, at which workmen are employed in putting the handles onto kettles, pots, and other goods that require these appurtenances.

Following the black iron goods as they descend in the elevator at the north end to the ground floor, we find them run on cradles through a large scaling oven located in front of the elevator. Having been in the oven merely long enough to remove any scale or grease that may have remained on them after the stamping process, the goods issue directly into the pickling room, which occupies a space 75 x 110 feet at the north end of the single story building. Here are located the pickling tanks in which the articles are immersed, after which they are placed for a brief space for drying on the top of a row of covered brick ovens ranged between the pickling and enameling rooms. After scrubbing and a careful examination to see if they have any impurities or defects that would prevent the enamel adhering to the metal, the articles are passed over to the coaters for dipping in the enameling pots.

If, however, the articles are destined to become Agate nickel-steel ware, the highest grade of enameled goods made by the Lalance & Grosjean Company, they are first transferred to the nickel plating room to be treated. This department, which is located at the northeast corner of the building, occupies a space of 75 x 50 feet and contains one of the finest nickel plating equipments in the country, consisting of ten tanks 16 x 5 feet in size, operated by two large dynamos. Here the goods receive a coating of nickel, which obviates the use of lead, arsenic or antimony.

A small army of women and girls is employed at the east side of the long 325 x 160 foot room, dipping the



A Fine Enameled Ware Plant.—Ground Plan of New Factory of Lalance & Grosjean Mfg. Company.

smaller articles into the enamel preparation. The larger goods are handled by men. After being dipped they are transferred to the drying racks, 22 in number, which occupy the middle section of the room and have a capacity of 40,000 pieces at a time. When dry the goods are transferred on cradles to the "mufflers," or ovens, to be fired. This operation consumes from 5 to 7 minutes. They emerge at a white heat and are allowed to cool, when they are redipped and again fired. The final coating gives a gloss and hardness to the ware, enabling it to resist all kinds of acids. After the final firing the goods, when cooled off, are ready for transfer to the south elevator and are taken up to be examined and assorted. Next they are run over the bridge to the papering and packing department on the second floor of the main factory building.

The firing muffles, 20 in number, which are ranged along the west side of the room, have about twice the capacity of the old muffles located in the main factory building. With the latter the goods are handled manually, but with the new ovens a special patented apparatus of ingenious design, in the nature of a traveling crane, is used to convey the goods into the oven and withdraw them from it. The muffles are heated, as are all furnaces on the works, with crude oil, pumped in from immense oil reservoirs located at the extreme west end of the company's plant. The necessary draft is supplied by compressed air brought in by pipes from the compression plant in the old factory. The use of oil fuel has been found very satisfactory in the experience of the company. Time and labor are saved and absence of dirt and dust is secured, while the fires can be instantly lighted or extinguished. This fact contributes to the remarkable cleanliness of the enameling shop and the absence of smoke and dirt in the atmosphere. Moreover, each oven is connected by underground flues with a large steel chimney located in the center of the building, so that no smoke or vapor is allowed to escape into the shop. The single story portion of the factory is covered by a triple peaked roof, provided with skylights and well ventilated, so that light as well as a clear atmosphere is provided. The floor under the ovens and drying racks is of concrete, but a wooden flooring is provided for the coating section, with a view to the comfort of the women and girls.

In connection with the hydraulic elevators, the waste water is conveyed into a tank for use throughout the building, in the pickling room, water closets, &c. From thence it passes into the company's own sewer, which connects with the sewage system of the city of Brooklyn, a mile and a half away. Toilet rooms are provided at either end of the building for the men and women respectively. The entire factory is lighted throughout by electricity.

The new enameling department is run steadily day and night, with different shifts of workers, operations being only suspended for 18 hours on Sunday. Meanwhile the enameling facilities in the old factory are also kept in operation as before. The new capacity is entirely supplementary.

City electrician E. B. Ellicott of Chicago furnishes the *Aluminum World* with the following figures of comparative tests of copper and aluminum wire for the Chicago fire alarm service. No. 10 wire was used and the tests were made before erection.

	Copper.	Aluminum.
Twist in 6 inches	55	27
Breaking weight, in pounds	515	275
Elongation, in 5 feet (inches)	3 4-64	1⅛
Weight per mile, in pounds	173	51½

Though the tensile strength of the copper wire was greater, it was not so great in proportion to its weight (three times the weight of aluminum) as that of aluminum wire. The copper wire gave a greater elongation and number of twists than the wire of aluminum. Mr. Ellicott says that the tests turned out better for aluminum than he expected. The line will be given a winter's test in Chicago, and has been strung in the stormiest section of the city and where it will also be subject to the smoke of the locomotives. If it is found in good condition next spring it will speak volumes for the use of aluminum wire for fire alarm service.

The Chicago Drainage Canal.

The practical completion of one of the greatest engineering works of modern times dates from the 2d inst., when the channel of the Chicago Drainage Canal was connected with Lake Michigan, through the Chicago River, and the water of the lake began to flow by its own gravity toward the Mississippi. The actual completion of the great enterprise will be delayed for perhaps two or three weeks until the Illinois authorities are satisfied that all requirements of the act permitting the construction of the canal have been complied with. Meanwhile the channel will be completely filled with water for its full length of 28 miles from Chicago to the controlling works at Lockport, which will be ready to be opened immediately upon the announcement of the official sanction, and the connection with the Desplaines River, thence to the Illinois River, and thence to the Mississippi will be established. The work has been actively pushed for over seven years, having been inaugurated September 3, 1892, when the first spadeful of earth was turned.

The canal is intended primarily to dispose of the sewage of the city of Chicago and thus prevent Lake Michigan from being contaminated, that being the source of the water supply for the inhabitants of that great and still rapidly growing city. Intercepting sewers are now in course of construction which will divert the flow of all the city sewers toward the drainage canal. Ultimately it is expected that the canal will form an important link in a system of navigable water communications extending from Lake Michigan to the Gulf of Mexico. For this reason the canal has been made wider and deeper than would otherwise have been necessary. A large channel was nevertheless needed merely for drainage purposes in order to properly dilute the sewage and render it innoxious to the citizens of the districts through which the water of the canal will flow. The minimum depth of the water provided for is 22 feet. The minimum width is 160 feet at the bottom. The volume of water passing through it is placed at a minimum of 300,000 cubic feet a minute, with a velocity of 1¼ miles an hour. The total cost of the work, including administration, right of way, railroad bridges, and interest on bonds issued by the city of Chicago, was $33,525,691 to the 1st of the present month. The cost of the actual construction was $23,693,014.

Most interesting engineering developments were connected with the work of excavation. While the problems presented to engineers and contractors were not surpassingly difficult, the manner in which they were executed and the rapidity with which the entire undertaking was pushed have marked a new era in canal construction. The Chicago *Tribune* states that it is an open secret at this time that when the first bids were made for contracts the figures were placed below the margin that would yield a just profit on capital invested and the labor demanded. These low bids were made with the object of securing the contracts on so vast an enterprise, with the hope in reserve of making it up on future contracts. This is a common method pursued in bidding for municipal and government contracts, and was followed with confidence at the beginning of the work on the drainage canal. The sequel was instructive, if nothing more. The contractors awoke to the realization that, while they were dealing with a municipality, it differed in its complexion, policy and methods from those of the general political run. While its officers were elected by popular vote, few of them wore partisan livery. For the most part they were straight business men, who had taken hold of a business proposition and proposed to push it to completion on business principles. This was a

revelation for some of the contractors, and the effect has been almost amazing in its results. The contractors were under heavy bonds for the performance of their contracts and the trustees declared their intention of holding them strictly thereto. There were tears and wailing, lawsuits and threats, but to no avail. Then the contractors turned to the other alternative and proceeded with the work. But in doing so they drew on their inventive genius, with the result of evolving some of the greatest labor and time-saving machines in the history of mechanical engineering. These machines have enabled contractors who were confronted at one time with a certain loss not only to perform their contracts to the letter, but to count profits far in excess of what they would have made under the old condition of excavation work and political "extras." In addition to this their inventions have given an impetus to great engineering enterprises, and made probable vast improvements that otherwise might have lain unhatched in the incubator of time for generations.

New forms of grading machines were devised, capable of moving 100 cubic yards of earth in an hour. Huge steam shovels were built, which fell but little short of handling 1000 cubic yards each of difficult material in ten hours. In some sections of the canal dredges could be used, and these were of the highest type of efficiency. Ingenious inventions were employed in conveying loosened material from the channel to the dumping grounds on the banks. These conveyors were of varied types, but in every case were designed for handling earth and stone with as little labor and as great rapidity as possible. Some were inclines running from the bed of the channel to a hight which brought the loads far over the dump. Others were composed of bridge work spanning the entire channel, with the ends supported on trucks running on rails laid parallel with the channel, the bridge serving to support conveyors which brought material from the channel and dumped it on the banks. Locomotives and temporary tracks were freely used. Some sections of the canal were blasted for their entire length and width from solid rock. The grand total of earth and rock removed in the course of the work was 43,478,659 cubic yards. It is stated that if the entire volume of the excavated material was deposited in Lake Michigan in a depth of 40 feet of water it would make an island one mile square with its surface 12 feet above the water line.

This colossal undertaking has proceeded despite legal as well as natural obstructions. The scheme has been fought by hostile interests within and outside of the State. Citizens of the interior of Illinois have not only feared serious consequences to their health from the flow of Chicago's sewage down their rivers, but material injury to property from the overflow of low lands by the increased volume of water. The people of other States have also been excited by the possibility of the contamination of their drinking water, although 300 miles from Chicago. Every care has been taken to disarm hostility and to convince those interested that no danger is to be feared, but all legal troubles may not yet be averted. If they are all overcome as they arise, and the waters of Lake Michigan are permitted to flow peacefully through this great channel, the people of Chicago will have increasing reason to be proud of their achievement from year to year. Pure drinking water is absolutely necessary to sustain the future growth of the city.

Some opposition has cropped out against the present officials of the Amalgamated Association. It is said that Theodore F. Shaffer, now president of the association, will have a strong opponent for re-election in the person of W. H. Evans. Thomas Reese, a roller at Canonsburg, Pa., will be a candidate for the position of secretary.

Pacific Retail Hardware Association.

As already announced, the second annual meeting of the Pacific Retail Hardware Association will be held at Chico, Cal., on the 17th and 18th inst. From assurances received by the secretary a large attendance is expected, who will be handsomely entertained by the Hardware merchants of Chico, which is better known in that section as the City of Roses. On the evening of the 18th a banquet will be tendered the visitors at the Park Hotel. The local Committee of Arangements, consisting of L. L. Hubbell, William Earll, J. H. McFeeley, and A. L. Nichols, are doing everything in their power to make this the banner meeting of the association.

Wisconsin Retail Hardware Association.

The Wisconsin Retail Hardware Association has just issued the official programme of the fourth annual meeting of the organization at the Republican House, Milwaukee, on February 7 and 8 next. The programme is issued in the form of a pamphlet, comprising 40 pages, is well printed and attractively gotten up, and reflects credit on its compilers. It has been sent out to the trade in a large manila envelope, on the address side of which in the upper left hand corner is the injunction: "Don't Forget, February 7 and 8."

Besides the programme of the convention, referred to more particularly below, portraits of the eight officers of the association are given, with a reference to its object, constitution, by-laws, resolutions of the Northwestern Retail Hardware Association, list of some of the Hardware associations of the country, &c. The pamphlet also supplies an imposing list of the members of the Wisconsin organization, the membership numbering nearly 300, scattered over more than 150 towns of the State.

The annual gathering will commence with a meeting of the Executive Committee on Wednesday, February 7, at 11 a.m. In the afternoon a general meeting will be held at which addresses will be made by President Montgomery, Vice-President Sheldon and ex-President Hughes, reports read by Secretary Peck and Treasurer Schlegelmilch, and papers presented by several members, including C. Krembs of Stevens Point. On Thursday, the morning session, after some routine business, will be devoted to "Talks on Insurance," paper by R. H. Suettinger, entitled "Doing a Cash Business," and Question Box discussion. The afternoon session will be an open one and a reception will be given to jobbers and manufacturers present, who will be invited to address the meeting. Papers will be read by John Hughes and R. L. McNamara, after which there will be a discussion of the contents of the Question Box. A feature of this session will be the appointment of a committee to confer or correspond with the Iowa and Illinois associations concerning their union with the Northwestern Association, which now comprises the States of Wisconsin, Minnesota and North Dakota.

It will thus be seen that an interesting order of exercises has been prepared and a large representation of the trade is expected.

"The Safety of Theater Audiences and the Stage Personnel Against Danger from Fire and Panic" is the title of an exceedingly able and instructive paper prepared by William Paul Gerhard of this city and published by the British Fire Prevention Committee in their series of brochures as No. 41. Mr. Gerhard's reputation as an engineer who has given much attention to sanitation, heating and general engineering of buildings is not confined to the United States. It is therefore not a matter of surprise that the British Fire Prevention Committee have availed themselves of his advice relating to the safety of theaters against fire. Mr. Gerhard handles the topic in a clear and direct way, and gives a most interesting analysis of the conditions that should be followed in theater construction with a view to the safety of people within their walls.

HOW THEY USED TO MAKE PIECED PANS IN THE LONG AGO.

BY FOSSIL.

Some *Metal Worker* readers have been interested by the article of "H. M. S.," in issue of December 23, 1899, because of the practical information it contains, but the chief attraction to me is that it brings up a memory picture of the ways and work of the old "assortment" tin shop, which I propose to delineate as a sequel to the writing that has suggested it.

We are watching, in imagination, the consecutive operations of a tinner who is about to make a lot of ten quart milk pans, and will take note of them in detail. He takes from a box of IX 10 x 14 tin an indefinite number of sheets, and by handling them singly in a way not easily described selects enough of uniform thickness to make the number of side pieces desired. There is an unwritten law to be observed in all the coming manipulations, which is, after each operation, to lay the sheets, or pieces, "work way"—that is, in the best place for the next following. For 100 10 quart pan bodies there are wanted—see "H. M. S"—200 pieces, cut cross ways of the sheet, and the same number cut lengthwise, but the patterns are to be used only 200 times, for two sheets may be marked and cut together. When the pattern has been properly laid on, avoiding waste of material, it is scribed around and the sheets laid in pairs convenient for the next operation, which is securing each pair together. Having cut a sort of tongue at the ends of each marked section, he gives these a finger turn, and drives them close with a mallet. All cutting out is done with the bench shears, and the first cut is on the bottom arc of the lowest marked section. Then he cuts the line of the top arc, and repeats in same form for each pair of sections in hand. He cuts on the end lines now, but lays the pieces, still in pairs, crossing each other at right angles. Taking them up in turn he makes the end cuts and the notches for burring and wiring, smoothing these last down with mallet blows.

They go now to the folder, where the locks are turned, and thence to the former, which is of wood, turned in cone shape. Seated astride of this, he shapes the sections as desired, then goes to the groover, where four pieces are connected into the semblance of a pan. Placing several bodies on the horn of a stake he evens and closes down the locks. Now the turning machine or thick edge to prepare for the wiring machine, which is used next. Each body is now inspected, and any projecting bottom edges clipped before passing to the burring machine, which makes ready for the bottoms. These are cut from 12 x 12 plates, selected as before. There is no pattern for them, and he must mark them out with compasses, securing a fit by measurements and practice. Two bottoms are cut at a time, with the bench shears, then burred singly and attached to the bodies. The next is to the setting down machine, and from that to the double seaming stake, where the tinner goes twice around the bottom with blows of a mallet, making a close joint with the body.

Now he starts a fire of charcoal and while it kindles puts rosin on the pan seams and files his "hatchet" coppers. Having a board in his lap and holding the pan at proper angle he solders the bottom seam inside, moving the pan under the copper. Next, the side seams are soldered and the pans are apparently finished, but if he has heated the bottoms too much they will spring under pressure and seem of light weight to the possible buyer. Another course on the double seaming stake will take that all out and make them feel "as thick as a board." Lastly he removes the extra rosin and rubs out finger marks with his apron, calling the job finished.

Let us figure a little in conclusion. The 100 10-quart milk pans represent some 25 different operations, and, moderately speaking, nearly 3000 motions, and any one so inclined may calculate the aggregate length of shear cuts the tinner has made. I am aware of modern machines which have expedited and cheapened the production of pieced tinware, also that some consumers prefer it at advanced price to stamped, thinking it more durable, because more costly. If the method of manufacture which I have described was a criterion of durability, the pans of our daddies should have outlasted them.

THE SHEET COMBINE MOVEMENT.

The matter of the proposed consolidation in the sheet iron industry is reported to be under way with promising prospects of success. Even without the two large interests in the Pittsburgh districts, which have steadily kept aloof, the work of consolidating the rest of the mills will go forward. A committee of manufacturers is working on the scheme, and Isaac W. Frank of Pittsburgh has again been appointed to receive options on the mills. He is said to have secured a number of such options, which expire on April 1. When these have all been gotten in, it is understood that the matter will be turned over to ex-Judge Moore, who will probably have the scheme in shape for the bankers by April 1. The manufacturers' committee which has the promotion in hand includes J. G. Battelle of the Cincinnati Corrugating Company, Piqua, Ohio, president of the Iron and Steel Sheet Manufacturers' Association; A. M. Brown of the Cambridge Iron & Steel Company, Cambridge, Ohio, and B. M. Caldwell of the Ætna-Standard Iron & Steel Company, Bridgeport, Ohio.

THE WELSH TIN PLATE TRADE IN 1899.

The following review of the Welsh tin plate trade in 1899 is taken from the London *Ironmonger:* In the tin plate trade there has been a large advance in prices. In the first half of the year ordinary cokes rose from $2.50 to $3.75 per box, with other kinds in proportion, but owing to the "slump" in tin the best figures were not maintained. So great an advance naturally resulted in the starting of a number of mills which through the depression previously existing had been closed, and at the present time there are about 420 tin plate and sheet mills running, employing over 20,000 work people. The largest number of mills ever at work in South Wales and Monmouthshire was 512, but it is calculated that the mills to-day turn out one-ninth more plates than they formerly did, so that really the trade may be said to have almost recovered its former elasticity. Orders from the United States are not so numerous as they once were and probably never will be again, but the excellent quality of the plates turned out in South Wales is beginning to tell even upon American manufacturers, and shipments across the Atlantic are gradually increasing. During the depression of three or four years ago large numbers of tin plate workers emigrated to America, but they have apparently discovered that the higher wages offered to them did not necessarily mean better conditions of life, and during the present year something like 80 per cent. of the emigrants have returned to their old haunts. One notable feature of the tin plate trade is the increasing demand for black plate for the Continent, the exports during 1899 having been over 30,000 tons more than those of last year. At the opening of 1899 this material was obtainable at from $45 to $46 per ton, but prices gradually advanced until in September from $60 to $61 was demanded. Since then, however, there has been a decline, and quotations now range from $55 to $56 per ton. The rapid advance in the price of block tin had of course a good deal to do with the increased prices asked for tin plate, for during the first nine months of the year block tin rose from $435 to about $750 per ton. Since then, however, it has sustained a severe drop. Needless to say, the workmen generally have participated in the improved state of trade. On August 1 they received an advance of from 5 to 7½ per cent., being the first general advance without the arbitrament of a strike for a period of ten years; and this was the result of an amicable agreement arrived at three months previously on the establishment of a Conciliation

Board. On October 1 the long contended for 1874 list of wages came into operation, under which the men received a further advance of 15 per cent. This list remains in operation until the end of March next, when it will be the subject of further revision.

National Sheet Metal Furniture.

The National Stamping & Enameling Company of New York City have just gotten out a novel line of sheet metal tables, chairs and settees, examples of which are

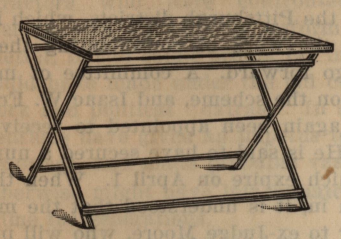


Fig. 1.—Sheet Metal Table, Open.

given in the accompanying illustrations. While Vice-President Frederick Haberman, of the company mentioned, was in Europe last summer, he came across some tables in use in France which gave him an idea in this

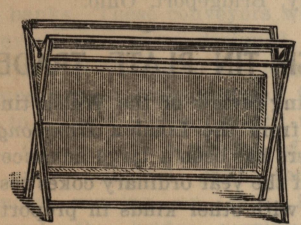


Fig. 2.—Sheet Metal Table, Folded.

line that has been developed and improved upon. The French tables were fixtures, but these now manufactured here are collapsible, so that they can readily be folded for storage or shipment. One example of these

Fig. 3.—Sheet Metal Table with Round Top.

tables is shown in Figs. 1 and 2. These goods are made of heavy sheet steel, the uprights being of heavy band iron, and the cross sections of extra refined steel. In Fig. 1 the table is shown as in use, and in Fig. 2, knocked

Fig. 4.—Sheet Metal Chair, Open.

down and folded. When packed for shipment they nest closely. They are grained and finished in a remarkably good imitation of oak and are made in three sizes of 24¾ x 24¾ inches, 24¾ x 30½ inches, and 23⅞ x 39½ inches, weighing respectively 25, 30 and 40 pounds, and each standing 31 inches high. Fig. 3 shows a round table of similar manufacture and finish and also collapsible. This table has a diameter of 24 inches, is 31 inches high and 18 pounds weight. In Figs. 4 and 5 are shown folding chairs constructed on the same principle as the table

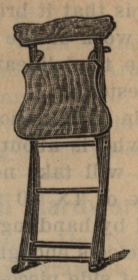


Fig. 5.—Sheet Metal Chair, Folded.

and of similar material and finish. These chairs are 40 inches high at the back with a seat 11¾ x 15½ inches. They also nest closely together and take up small storage space. The seat slips up and rests against the back, and the legs fold together in one movement. This furniture is very strongly built and stands stiffly. It is calculated to withstand rough handling, but is light withal, so it can be easily carried from place to place.

Henry W. Merchant.

The many friends of Clarke Merchant of Merchant & Co., Incorporated, Philadelphia, will deeply sympathize with him in the loss of his son, Henry Watts Merchant, who died in Phœnix, Ariz., January 9, in the thirty-seventh year of his age. Mr. Merchant left Philadelphia for California about four months age in search of health, and the news of his death was a great shock to his friends and family, as reports had come that he was improving in health. Mr. Merchant had been associated with his father in business for many years, and was well known in the trade. He was a member of the Loyal Legion and the Philadelphia Club. Mr. Merchant is survived by one young daughter, his wife having died four years ago.

The Welsh Tin Plate Wage List of 1874.

The wage list of 1874 has always been the basis appealed to in the adjustment of the wages of the tin plate workers of South Wales. It may therefore be of interest to reproduce the list, which is as follows:

	s.	d.	Approximate equivalent in United States money.	
Rolling, list sizes, doz ...	3	5	$0.82	Bar iron to be cut and delivered to the mills, furnacemen to open stickers.
Doubling, list sizes, doz.	2	9	.66	
Furnacing, list sizes, doz.	2	7	.62	
Behinding, list sizes, doz.	1	3	.30	
Shearing, list sizes, doz..	1	1	.26	
Annealing, list sizes, 100.	12s. to 14s.		2.88 to 3.36	According to class of work.
Black pickling, 100.....	6s. to 6s. 6d.		1.44 to 1.56	Or by day, as may be agreed upon.
White pickling, 100.....	5	6	1.32	
Tinning, list sizes, box..		3	.06	
Washing, list sizes box..		3	.06	
Greasing, list sizes, box..		1	.02	
Sorting, day, three sets.	6	3	1.50	

Concentrating Tin Plate Works.

The report that the American Tin Plate Company had issued orders for the starting up of the Star and Monongahela plants in the Pittsburgh district, which have been idle for some time, has not been officially confirmed by the company. We can state that the American Tin Plate Company will probably before long be manufacturing tin plate in only three districts. One of these will be the Elwood, Ind., district; another the New Castle, Pa., district, and a third not yet fully decided upon. It has been found that tin plate can be manufactured at a lower cost outside of the Pittsburgh district than in that city.

FLASHINGS.

The Barnes & Nuss Hardware Company, Grand Forks, N. Dak., are doing a large business through the Northwest in the manufacture of Sheet Metal Goods, including Cornices, Ventilators, Skylights, &c., for which they have recently booked some good sized contracts.

C. Ed. Schenerlein, 20 Zane street, Wheeling, W. Va., who does galvanized iron and sheet metal work and handles Stoves and Ranges, began business at the above address in 1878. Ten years ago the name was changed to Schenerlein & Brother, but Mr. Schenerlein is now alone, the business being carried on under the name of C. Ed. Schenerlein. When he began business he was alone and unmarried, but has now two of his own boys working in his shop.

Henry Weyand, Waterbury, Conn., reports large shipments of Eave Trough, Gutter and Conductor Pipe to various points in New England. He has had a large business and a prosperous year.

The Ohio Steel Roofing & Mfg. Company of Belle Center, Logan County, Ohio, have been incorporated by James B. Pergin, J. L. Pergin, J. E. Ramsey, Earl W. Ramsey and M. C. Laughlin, and are to be operated on $100,000 capital stock. The company are to engage in manufacturing and dealing in Steel Roofing, Spouting and Galvanized Tanks, Sheet Metals, &c.

Friedley & Voshardt, 194 to 200 Mather street, Chicago, have issued a decidedly neat pocket catalogue mainly devoted to Steel Ceilings. The Ceiling designs are shown in a series of well executed half-tones, giving Corner Pieces, Center Panels, Combinations of Borders and Center Panels, Combinations of Panels of Different Patterns, Coving Patterns, Moldings, &c. The designs for this class of work are largely original, and are exceedingly artistic. Illustrations are also presented of the company's Sheet Metal productions in other lines, as, for instance, Letters and Figures, Statuary, Festoons and Garlands, Gable Pieces, Gargoyles, Column Capitals, Shingles, Tiles, Crestings, Finials, &c. The book comprises 48 pages.

Last week six carloads of galvanized iron were shipped from Chicago, bound to Manila, to be used in the construction of a large ice making plant for the Government. The plant was constructed by Knisely Bros. of Chicago, and Charles T. Knisely, a member of the firm, and William Clem will superintend the construction.

SCRAP.

The Black Plate mills of the American Tin Plate Company, at Montpelier, Ind., employing 200 men, were shut down indefinitely this week. It is said that the company may remove the mills to either Elwood or Anderson, Ind. The people of Montpelier gave a bonus of $27,000 for the establishment of the plant and, it is said, they contemplate injunction proceedings against its removal.

The Tin Plate mills of the Lalance & Grosjean Mfg. Company at Harrisburg, Pa., which were closed for a week for stock taking, &c., resumed operations on Monday.

The American Tin Plate Company have declared their regular quarterly dividend of 1¾ per cent. on the preferred stock, payable January 31.

The establishment of reduction works for the treatment of Tin Plate Scrap is already making its mark among Can factories and other places where Tin Plate is cut up. A local paper records the dispatch recently from Eastport, Maine, of four cars loaded with Tin Scrap. Up to lately this waste product of the Maine sardine canneries was dumped on the beaches as absolutely worthless.

We are informed that the main offices of the American Tin Plate Company, which are to be removed to New York from Chicago, will be located in the Battery Park Building, which is nearing completion. The offices of the National Steel Company will also be removed to this building from Chicago. The transfer will be made as soon as the building is completed, which will probably be several weeks hence.

The Laughlin works of the American Tin Plate Company, at Martin's Ferry, Ohio, which have been idle for some time, resumed operations in part on January 8. This plant contains 14 mills, and it is said that it was in operation only about four months during all of last year.

We are indebted to J. M. & L. A. Osborn, manufacturers and jobbers of Tin Plate, Tinware, &c., Cleveland, Ohio, for a useful little memorandum book which they are ready, they state, to send to any of their friends in the trade who desire a copy. The book is of a handy size, 5½ x 2½ inches, suitable for the vest pocket, is neatly bound in leather and contains, in addition to a large number of blank pages, several pages of useful information and space for addresses and accounts.

TRADE NOTES.

Franklyn M. Wise, manufacturer of Aluminum goods, suffered a loss of about $5000 by a fire which damaged his factory at 338-342 East Fifty-ninth street, New York, on Saturday last.

The Rochester Stamping Company of Rochester, N. Y., were incorporated, January 5, with a capital of $300,000, to manufacture Metal Goods and Specialties. The incorporators are Millard F. Robeson, George W. Robeson and Alfred R. Pritchard of Rochester; Irving G. Robeson and Milo H. Olin of Perry, N. Y., and Willis H. Tuttle of Canandaigua, N. Y.

It is reported that the Pittsburgh Reduction Company, New Kensington, Pa., are preparing to manufacture the recently discovered Aluminum product, Magnalium.

The Harrisburg Pipe & Pipe Bending Company of Harrisburg, Pa., recently incorporated, with a capital of $1000, have filed notice of an increase of the capital stock to $400,000.

In our advertising columns notice is given of an important auction sale of the Lalance & Grosjean Mfg. Company's Enameled Ware and Stamped Tinware, seconds, to be held on Thursday and Friday, January 18 and 19, by E. Bissell & Co., 12 Murray street and 15 Park place, New York.

The Crescent Stove Polish Company have been incorporated in Minneapolis, Minn., to manufacture Stove Polish and Utensils to be used in blacking Stoves. The company will be located at 1515 Hennepin avenue, the officers being: President, J. M. Truesdell, and Secretary and treasurer, E. H. McAllister.

At a meeting of the Inguaran Copper Company held in Paris, France, the capital stock of the corporation was increased to $10,000,000. The company, of which the bulk of the stock is owned by the Rothschilds, own the Inguaran copper mines in the State of Michoacan, Mexico.

THE LETTER BOX.

FURNACE FAILS TO HEAT THE CHURCH.

From W. W. S., New Orleans, La.—As suggestions from correspondents are requested concerning "A. G's." unsatisfactory heating system, presented in *The Metal Worker* of December 9, I beg leave to recommend a method which I have found very satisfactory and which may perhaps fit the case in point. In the first place, it is impossible for any one to form any definite conclusions as to what may be the trouble because so little information in reference to the buildings and surroundings is given. Therefore I do not touch upon a very important question—that of the furnace being overtaxed—nor upon another equally important—the relative area of hot and cold air pipes—but confine myself to the principles involved, presuming that all the details, such as the above, and the necessary rise to the pipes, &c., have been properly looked after in setting the furnace.

We know that hot air is lighter than cold air; hence hot air rises and cold air descends when currents of each come in contact. We also know that all forces travel in the line of least resistance; hence, in attempting to correct the existing trouble, I would first try a circulating system as follows: As the 30 x 30 inch register does no good where it is I would remove it and locate it where the floor of the church is lowest, preferably close to where the 10 x 15 register is located now. I would run the duct from this register into the bottom of the furnace, thus converting it into an exhaust, providing it and the cold air duct both with tight air dampers, so that both may be shut off at will. The 10 x 15 inch register I would remove and in its place put the 20 x 24 inch register now located in the ladies' aisle. I would change the 22 x 24 register now in the gentlemen's aisle to a point near or about opposite to the furnace and place the 10 x 15 register where this 22 x 24 inch register is taken from. These changes, including of course the necessary piping in the basement, can be made without great cost, as they involve more swapping around than anything else, but they accomplish the locating of the registers much nearer to the furnace, so that the run of the pipes is shorter and the rise correspondingly greater, without moving the furnace at all.

Hot air from short pipes from the furnace is hotter than when it has been chilled by a passage through long pipes in the cellar. When it escapes at the floor of the church it instantly rises to the ceiling. There it spreads out and travels in the line of least resistance to where the air is colder—namely, near the windows. Here it loses some of its heat and descends to the lowest point of the floor, where, being influenced by the exhaust duct, it is sucked back into the furnace and the lost heat restored, when it is again discharged into the church and a circulation set up which continues. Beginning with the church when it is empty the interior air in this way becomes quickly heated and a great saving of fuel is effected. When the congregation commences to arrive the sexton or other attendant simply closes the exhaust air damper and opens the cold air supply, from outside, when the normal operation of the furnace takes place. This reversal of the system is necessary from the vitiation of the air by its absorption of any impurities that it might take up in sweeping over ceilings, walls and furniture and principally of course from the lungs and bodies of the assembling congregation.

It will be found in practice that the warmest places in the church are those on the sides of the church opposite the furnace. In this instance, if the furnace is capable of supplying warm air to the amount indicated by the area of the registers and the 30 x 30 inch register is necessary in addition to the others, then locate this big duct and register as close alongside the 30 x 30 exhaust duct as it can be conveniently placed. It may seem strange that suggestions come from one who is located at a point where it is popularly supposed to be perpetual summer, but the climate of New Orleans is such that the thermometer frequently drops to 15 and 20 and was down last winter to 6 degrees. The humidity is such that even freezing weather is felt more than a dry climate at zero, so you see that we have to use furnaces and fires once in a while anyhow, and our houses being of light construction, which lets the cold leak in at every crack, we think our furnaces are like our Texan friend and his pistols—he did not need them often, but when he did he needed them bad, and that is why he wanted their quality good. Hoping this will give "A. G." something to think about and simply adding that these theories have been amply demonstrated in my own experience, I add my best wishes for *The Metal Worker* and its readers for success the coming year.

From M. S., New York.—Having had a similar experience in church heating to that which "A. G." described in *The Metal Worker* of December 9 I will give him the benefit of my experience in that line. Some of the readers will doubtless remember the letter from "M. S.," New York, in *The Metal Worker* of February 25, 1899, in which he states his troubles. There were four or five replies, but as none of the recommendations were advisable under the existing circumstances I will tell what I did to remedy the trouble, which was largely due to a cold chimney on the outside of the building. I persuaded the trustees that the chimney must be moved, which was done, and it was located within the walls of the church in the lobby on the left side, between the window and the partition, and a ventilating flue was put in, which could be opened to supply air to the furnace room when the draft was poor; but this chimney being built properly and of the right size and plastered throughout, there never was any need for opening this ventilating register, as a strong draft was provided. The next thing was to put in a furnace of sufficient capacity to leave no doubt as to its being able to heat the church, which was 34 x 44 feet, with a 24-foot ceiling. The furnace now in use has a 30-inch fire pot with a 24 inch grate. Three 14 inch pipes run from the furnace to registers in the side aisle and in front of the pulpit, and a 12 inch pipe was carried to the lobbies. We made the cold air box of the same capacity as the combined areas of all the pipes and took it from the west side of the church near where the old chimney was located. An exhaust from the church was connected with the cold air duct by means of a tee, with dampers placed so that the air can be supplied from out of doors or exhausted from the church at will. The furnace and dampers are adjusted to circulate the air to the furnace for heating previous to the assembling of the congregation, and some times it is necessary for the circulation to be continued after the congregation is assembled when the weather is severely cold. Yesterday was a severely cold day here, with a cold wind blowing and the mercury standing at zero. The church was heated to 70 degrees, so I think the job is O. K. now. These three things are the principal things to look after in heating a church—good draft, ample heater, a sufficient cold air supply, and the hot air pipes should be of sufficient capacity to carry away all the air that the furnace will heat. I thank those who kindly assisted me in my trouble and hope "A. G." will have no trouble in solving his problem.

REMOVING RUST FROM TINNERS' TOOLS.

In reply to an inquiry from "F. G.," Idaho City, Idaho, that appeared in *The Metal Worker* December 16 we have received the following communication in verse from A. L. Burtis, Lockport, N. Y.:

The shop tools of our fathers
Stand idly in their place;
The turners, burrs and hammers
All wear a rusty face.
And youngsters are now asking
What best the rust removes.
I tell them they must use them more;
Their answer brings the blues.

And starts my head to thinking
Of the days, now passed away,
When at the bench I labored
Making tinware day by day.
When all the tools about the shop
Were polished up by use—
No rusty spots were on them then,
Nor marks of man's abuse.

"F. G." tells a sad story—
That's how it seems to me;
Now young men say that things have changed
From what they used to be.
I think they scarcely know—
These tools are strange to them,
Which in my day were worn so bright
With use by earnest men.

And so I can't help thinking
Of the days, now passed away,
When at the bench I labored
Making tinware day by day;
When all machines in ev'ry shop
Were polished up by use,
And ev'ry tool protected
From the shadow of abuse.

They tell me that they seldom use
The turner or the burr,
The square pan, swedge or seamer—
They scarce know what they're for.
The planish hammer drives the punch
That once did copper spot;
The raising hammer, once so bright,
Pounds rosin in the shop.

So I'm thinking, sadly thinking,
Of the days, now passed away,
When at the bench I labored
Making tinware day by day.

WHAT IS THE TROUBLE WITH COPPER FOR GUTTER?

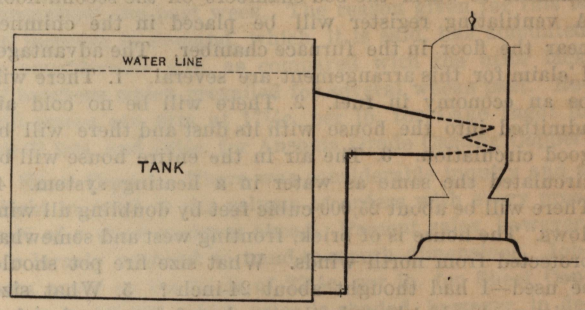
From W. L., Troy, N. Y.—I would like to hear from the readers of *The Metal Worker* their experience with the use of soft copper of 16-ounce weight in comparison with cold rolled copper for lining gutters and valleys. I do not know what is the reason, but soft copper does not seem to give satisfaction around this section. It buckles and wrinkles in every shape and cracks, especially when it is used for gutter lining. I would be glad to hear from those who have had experience as to the cause of this trouble.

Note.—Those who do copper roofing are invited to express their views on this subject. In the meantime we would say that it is quite generally customary to use soft copper for the purpose mentioned, and it has been frequently noticed in box gutters, where the sun has full play, that the copper does buckle and wrinkle, and sometimes cracks at the top of these wrinkles, making repairs necessary. It may be that some of our readers have a method of providing for this excessive expansion and if so we hope that they will explain their methods.

HEATING A TANK.

From B. T., New York.—I submit herewith a sketch of a tank extending below the floor and a pipe leading from the bottom of the tank to the coil in an oak stove, and another pipe leading from the top of the coil to a point just below the water line in the tank. Will this apparatus heat the water satisfactorily?

Answer.—There can be no doubt but there will be a circulation of water through the coil, and with a fire in the stove the water must necessarily become heated. It will be necessary to have the pipe pitch from the coil in the stove to the tank so as to allow any air or steam that may accumulate in the coil to pass off. If the size of



Heating a Tank.

the tank had been given with the size of the fire pot in the stove and the size of the coil and piping some idea could be gathered as to the time that would be required to heat the water.

A SCRAP BOOK HABIT.

From C. W., New Jersey.—A few years since I noticed the suggestion in the Letter Box of *The Metal Worker* at the beginning of a new year to keep a scrap book during the year of the different articles on the various lines of trade in which the average tradesman is interested. I have followed this custom ever since and have now accumulated a mass of valuable information on furnace heating, steam heating, hot water heating, plumbing, plumbing regulations, lead burning, cornice work, tinsmithing and pattern cutting. I have not followed the suggestion of having an envelope for these different things, but have secured pieces of paper of the same size as the pages of *The Metal Worker* and have secured binders so that the new pages can be inserted at various points as found desirable and according to the index which I have prepared as a result. I take the wires out of the paper with which it is fastened together when I receive it so that I have the full size of the page of *The Metal Worker* and have an ample margin at one side for fastening into the binder. In my plumbing binder I have several heads and will give a few, so that others may understand my method: "Cesspools and Sewerage," "House Drains," "Soil Stacks and Vent Pipes," "Traps and Their Connections with Fixtures," "The Proper Connection for Fixtures," "Water Back and Boiler Connections," "Hydraulic Rams and Pumps," "Tanks and Their Linings." All of the other trades have their binders indexed in a similar fashion, so that if I was to look up any subject, like the size of steam pipes to be used on a job or the size of a cold air supply for a furnace, I need not look through a lot of papers, but simply through the index and then turn to the division formed by the blank pages in the binder, where I can readily refresh my memory and gain information as to the best method of laying out different kinds of work. Having not only found this of great benefit to myself but a very valuable help to the young men and old men in the shop I send my letter, in the hope that some other subscriber may find it useful in his business.

INFORMATION WANTED ABOUT A FURNACE JOB.

From J. V. B., Missouri.—I have been much interested in the articles on furnace heating by William G. Snow in *The Metal Worker*, and would like to ask him for information on a system I have in mind for warming a house now under construction. The house will contain eight rooms and a bath, with four rooms on the first floor, which will be 16 feet square. The house will be about square and the furnace placed on the first floor in the center, the inside corners of each room being cut off at an angle to form a furnace chamber, which is to be constructed of brick and made absolutely safe from fire. The furnace will be fed from the kitchen door, which will be protected with metal and asbestos. The furnace chamber will have registers at the top and bottom for each room on the first floor and registers in the ceiling of the furnace chamber to warm the bed chambers on the second floor. A ventilating register will be placed in the chimney near the floor in the furnace chamber. The advantages I claim for this arrangement are several. 1. There will be an economy in fuel. 2. There will be no cold air admitted into the house with its dust and there will be good circulation. 3. The air in the entire house will be circulated the same as water in a heating system. 4. There will be about 25,000 cubic feet by doubling all windows. The house is of brick, fronting west and somewhat protected from north winds. What size fire pot should be used—I had thought about 24-inch? 5. What size registers should I have in the angles of furnace chamber walls at top and bottom? 6. Would it be necessary to have a casing around the furnace if inclosed in brick wall? 7. If furnace is cased and pipes run to each register would it be necessary to build this chamber of brick? Would not lath and plastering covered with asbestos be sufficient? 8. The main object in the arrangement I have described is convenience in attending to the furnace. It would not be necessary to go down to and up from the cellar.

Answer.—We have submitted this inquiry to William G. Snow, the author of the serial on furnace heating, who furnishes the following comments:

The intended arrangement is clear enough except as to the ventilating register. Whether this is placed in the hall and ventilates all the rooms on the first floor through their connecting doors or is located in one of the living rooms is not stated.

Discussing in the order given the advantages claimed and the questions asked—

1. The economy in fuel will be secured at the sacrifice of ventilation, since the air is to be used over and over.

2. It may be well enough in certain cases to admit no cold air to a furnace in sharp windy weather, but at other times the absence of a cold air box will be a source of annoyance. Especially will this be true in mild weather, when it is difficult to avoid overheating. In general, furnaces will work much better when the flow of air through the pipes is aided by the wind pressure in the cold air box than when air is taken from the cellar or through a return duct.

3. The air from the first-floor rooms is returned directly to the furnace, that from the second floor is presumably to be returned through the staircase hall, no mention being made of separate return ducts. The house itself acts like a great flue, and warm air on the second floor tends to remain there or to leak out through the lee side, in opposition to the action of the furnace tending to draw it back. Therefore, since all the air cannot be reheated a portion of the supply must be drawn through the walls and floors and around the windows of the lower story. This inward leakage will be likely to produce cold drafts.

4. As to the size of the furnace: Four 16 x 16 rooms with halls, closets, &c., will probably give a floor plan about 40 x 40 feet. Assuming first floor to be 9 feet 6 inches, second floor 9 feet, the exposure will be 2960 square feet. Deducting the exposure of the kitchen, which is self heating, the corrected exposure is 2656 square feet.

Table II in "Furnace Heating" in *The Metal Worker*, October 14, 1899, gives the capacity of furnaces in square feet of exposure when air is taken from out of doors. This table shows a 28-inch fire pot rated for an exposure of 2680 square feet. When air is to be reheated a smaller furnace may of course be used. With such a scheme, if the house could be made perfectly tight, the only loss of heat would be that by transmission, which would equal about one-half that by transmission and leakage combined when all the air is taken from out of doors.

The loss of heat by leakage when it is attempted to return all the air to the furnace is uncertain. If we assume that three-fourths of the air supplied to the first floor and one-fourth of that supplied to the second is returned, the volume of air delivered to each floor being the same, one-fourth the air supply to the first floor and three-fourths that to the second, equal to one-half the total air supply, must come from the outside and be drawn in as stated in 3.

The loss by leakage will be one-half what it generally is, representing a saving of one fourth the total loss of heat—*i.e.*, the combined loss by transmission and leakage. Hence a furnace having three-fourths the area of a 28-inch fire pot, equal to a 24-inch pot, will do the work.

5. The size of registers for first and second floors for ordinary furnace systems may be obtained from Table IV, "Furnace Heating" (*The Metal Worker*, October 28, 1899). This table gives, for a 16 x 16 room on first floor, an 11-inch pipe; for second floor a 9-inch pipe.

In the proposed system there are no pipes; the furnace setting is carried up to the ceiling, where side wall registers to the first floor are taken off, floor registers being used for the second story. Pipe sizes stated will be ample under these conditions, since the volume of air delivered through them need not be as great as when out door air is used. Registers should be 12 x 15 and 9 x 14. The registers at the bottom of the furnace should have a combined area equal to about nine-tenths the area of the warm air registers. The expansion of air is less than in the ordinary system.

6. If the furnace is inclosed by a brick wall, say 8 inches thick, a casing will be unnecessary.

7. If the furnace is double cased and pipes are run to the rooms the chamber need not be of brick, if all wood work is kept a good distance from the casing and is properly protected with tin, metallic lath and plaster or asbestos. In a city with modern building laws it would be necessary to place the furnace on non combustible beams and arches.

9. If coal is to be used it is hard to conceive where a bin could be located near the furnace on the first floor without the sacrifice of valuable floor space. The dust nuisance when ashes are removed would be much greater in the proposed location than with the furnace in the cellar.

IRON CEMENT.

From B. E. G., Delaware.—Please tell me if there is a cement to mend broken iron as strong as new and how is it made?

Answer.—The recipe books give various formulas for cements for iron, one of them, taken from a well-known authority, being to mix powdered cast iron bore chips, 60 parts; sal ammoniac, 2 parts; flowers of sulphur, 1 part, and stir the mixture into a stiff paste by adding water. The cement must be used while fresh.

Statistics of the ocean passenger trade between New York and Europe shows a material increase in the number of both cabin and steerage passengers landing at New York last year as compared with 1898, an unfailing test of prosperous times in this country. The number of cabin passengers was 107,415, an increase of 26,829 and of steerage passengers, 303,762, an increase of 84,111 over 1898.

TRADE REPORT.

MARKET SUMMARY.

PIG TIN has advanced ½c., with light stocks and steady consumption.

COPPER has stiffened slightly, but retail prices are not changed.

PIG LEAD remains very strong, with an upward tendency.

SPELTER is still easy, but has developed a little better tone.

TIN PLATES are moving in good volume, with no excess of stocks. Prices are firm and likely to remain so.

BLACK SHEETS are stiffening at mills, although retail prices are still low here.

GALVANIZED SHEETS remain firm and are in better demand.

PIG IRON is dull for the moment. No. 2 Foundry is selling about 25c. a ton lower.

SHEET BRASS is reduced in price about 5 per cent., also Brass Wire.

BRAZED BRASS TUBING shows a similar decline.

PIECED TINWARE has been marked up 5 per cent. in price.

WIRE NAILS and Smooth Wire are firm at the recent advance, but some jobbers are still quoting below the market.

ROOFING SLATES show reductions in price by new list issued January 10.

LINSEED OIL prices have been advanced 2c. per gallon, on the strength of short supplies.

PLUMBERS' SUPPLIES continue active with an exceedingly strong market and indications of further advances in certain lines.

DRAWN LEAD TRAPS AND BENDS will probably be advanced next week, owing to the rise in Pig Lead. Galvanized Range Boiler prices, it is believed, will shortly be marked up at least 10 per cent.

ENAMELED BATHTUBS, as well as all Sanitary Enameled Ware, have been advanced by jobbers generally, following the consolidation in the trade.

METAL MARKET.

Pig Tin.—The market has fluctuated to some extent during the week. Values were unsettled and inclined to weakness. A sharp advance in the London market on Thursday, however, served to brace up the market for spot Tin, which closed about ½c. above the prices ruling a week ago. Arrivals have been small, stock on hand is well concentrated, and that afloat is also light, so that it is easy for holders of the metal to demand high prices for spot and this month's delivery. As a consequence there is quite a wide gap between this month's and February's deliveries. Jobbers are quoting Straits Pig in small lots at 27c. per lb. Buying by consumers has been well up to the average for the season.

The annual Pig Tin statistics of the New York Metal Exchange are:

SUPPLIES.

Supplies increased during 1899:

	Tons.
From the Straits Settlements	300
From Australia	950
From Bolivia	900
From Billiton sales	5
Total increase	2,155

DELIVERIES.

Deliveries during 1899:	
London decreased	2,080
Continent of Europe decreased	4,120
Total European decrease	6,200
United States increased	2,503
Net decrease	3,697

The apparent heavy reduction in deliveries in Europe may be due to the using up of invisible supplies, owing to the high range of values.

Copper. — There has been a slight stiffening of values throughout the past week. The reason given for this is an increase in demand, which, it is said, has amounted to considerable size, as compared with the utter lack of business which prevailed for several weeks past. Retail prices are firm at 17½c. per lb. for Lake Ingot in small lots, and 16½c. for Ansonia Grade Casting Copper.

Sheet Copper.—There was considerable inquiry and a slight increase in the volume of orders with every prospect of a good business ahead. Present sales, however, are largely confined to hand-to-mouth dimensions. Jobbers quote on the basis of 22½c. per lb. for Sheet Copper in small ots, which price is shaded, however, in desirable orders.

Pig Lead.—The market has remained very steady with a fairly large volume of orders. The outlook for firm prices and a large business is considered bright. Jobbers quote American Pig in small lots at 5⅛c. to 5¼c. per lb.

St. Louis advices report a better feeling in that market, with refiners holding their prices firmly. Lead Ore advanced 50c. per ton.

Spelter — This metal remains easy. Buying here is still rather tame, and the market, while a trifle steadier, is still somewhat unsettled. Jobbers are quoting good Western brands in small lots at about 5¼c. per lb. Certain producers, it is said, are out of the market. claiming that they cannot make the Spelter at the figures now ruling when the present price of Ore is considered.

St. Louis advices report: There is not any change in Spelter. No transactions are of record. If anything the market may be considered a trifle stronger. Buying, however, is light.

Sheet Zinc.—Is unchanged, with a moderate movement into consumption. Jobbers quote 600-lb. cask lots at 7¾c. per lb., and smaller quantities at 8c. to 8¼c.

Antimony— No change has been made. Cookson's in small parcels is quoted at 11¼c. per lb., and Hallett's and U. S. at 10¼c.

Nickel — Remains steady and unchanged at 40c. to 42c. per lb. for small lots.

Aluminum.—An active demand continues with prices unchanged. Small lots of No. 1 Ingot, guaranteed over 99 per cent. pure, are quoted at 37c. per lb., and 100-lb. lots at 35c.

Tin Plates.—There has been a marked increase in the demand since our last report. It is said that the Tin Can interests are ordering heavily. Some of this business is coming the way of the jobbers. One 25,000-box order was in the local market this week, and a good deal more business on a similar scale is in prospect. Importations of foreign Plates have been condiderably heavier of late, but this is explained by the fact that very large orders from the British Government for canned provisions for the troops in South Africa are being filled in this country, and an enormous business of the same character is in sight. Consequently the exporting packers are laying in heavy stocks of rebate Plates. Welsh Plates cannot compete in this country with the domestic product for

home consumption. The feeling in the market is very firm and prices are well held. The American\Tin Plate Company are booking orders at present rates for delivery up to the end of June. This steadies the market and gives confidence to buyers, being regarded as a guarantee against fluctuations in prices for the next six months. There is a good deal of retail business going on. Jobbers quote small lots of American Bessemer Coke Plates, 16, 14 x 20, delivered at New York or corresponding point, at $5.25 to $5.30 per box. The producing capacity has been increased by the restarting of a number of idle works.

Chicago advices are as follows: Manufacturers are behind on deliveries, owing to the fact that many of their customers who were slow in sending in specifications are now asking for shipments all at once. The mills are now crowded to make the deliveries desired. Jobbers report only a reasonable demand. It is perhaps better than usual at this time, but is nevertheless of only moderate volume. It is remarkable that a continued good demand is found for furnace sizes. Prices are unchanged.

Sheet Iron.—There is a good deal of inquiry for Black Sheets, but the mills generally are refusing to sell, except for January and February delivery, for the reason that at present prices on Sheets they would show a loss based on $36 Bars. Buyers are willing to place orders for delivery running up to August and September at present prices, but mills will not sell. The Sheet mill consolidation scheme now in hand is believed to be likely to go through by April 1, and this factor tends to stiffen the Sheet market. Locally prices are fairly firm, but Black Sheets are being shaded to some extent by jobbers who have good stocks on hand. No. 27 Common, in small lots, are quoted at 3.40c. Galvanized Sheets are moving fairly well at 70 and 5 to 70 and 10 per cent. off the list. Some mills are said to be holding out for higher prices on Galvanized Sheets.

Chicago advices are as follows: A somewhat better inquiry has recently been noted, but it is mainly for small lots. Buyers are not disposed to place orders as far ahead as usual. The movement to consolidate the Sheet mills is making progress, and it is likely that within the coming month something may be accomplished in this direction. Jobbers are finding a better demand from stock and quote small lots at 3.25c. to 3.45c. for No. 27 Black and 70 and 10 to 70 and 15 per cent. off on Galvanized Sheets.

Old Metals.— The market is quiet and devoid of any features of special interest. Prices show no change. Dealers quote about the following buying prices for moderate sized lots, delivered at yard in New York and vicinity:

Heavy Copper	per lb.	14½c.
Light and Tinned Copper	per lb.	13¼c.
Heavy Brass	per lb.	10½c.
Light Brass	per lb.	8¼c.
Lead	per lb.	4¼c.
Tea Lead	per lb.	4 c.
Zinc	per lb.	3½c.
No. 1 Pewter	per lb.	17 c.
No. 2 Pewter	per lb.	9 c.
Tin Plate Scrap, per gross ton		$6.00
Wrought Iron Scrap, per gross ton		12.75
Heavy Cast Scrap, per gross ton		11.25
Stove Plate Scrap, per gross ton		7.50
Burnt Iron, per gross ton		5.50

THE PIG IRON MARKET.

New York.—Some business has been done during the week, but the larger lots have been placed only by making moderate concessions. Prices are as follows: Lehigh and Schuylkill Irons, for 1900 delivery, No. 1 Foundry, $24 to $25; No. 2 X, $22.50 to $22.75; No. 2 Plain, $21.50 to $22. Southern brands are quoted: No. 1 Foundry, $22.75 to $23; No. 2 Foundry, $21.75 to $22; No. 1 Soft, $22.50 to $2.75; No. 2 Soft, $21.50 to $22; No. 3 Foundry, $21.50 to $21.75.

Chicago.—Some inquiries are being received for deliveries during the first half of this year, but the volume of business actually closed has been light. Local producers are making heavy shipments on contracts and are considerably behind on deliveries. Lake Superior Charcoal is strong and very little is to be had from any of the standard companies. Southern sales agents report a firm front on the part of their principals, with the leading companies so well sold up as to have very little Iron available for the whole of this year. A renewed buying movement is expected shortly, as consumption is very heavy and the full requirements of the foundry trade are by no means covered. We quote for cash as follows:

Lake Superior Charcoal	$25.50 to $26.00
Local Coke Foundry, No. 1	24.50 to 25.00
Local Coke Foundry, No. 2	23.50 to 24.00
Local Coke Foundry, No. 3	22.50 to 23.00
Local Scotch, No. 1	25.00 to 25.50
Ohio Strong Softeners, No. 1	25.50 to 26.00
Southern Silvery, according to Silicon	25.50 to 27.00
Southern Coke, No. 1	22.85 to 23.35
Southern Coke, No. 2	21.85 to 22.35
Southern Coke, No. 3	20.85 to 21.30
Southern Coke, No 1 Soft	21.85 to 22.35
Southern Coke, No. 2 Soft	21.85 to 22.85

Philadelphia.—The situation in Pig Iron appears to be very strong, although at present it is far from active. The indisposition to make new engagements is as marked as it has been at any time during the past month, but makers appear to be confident of their position and are not inclined to make the slightest concession from the figures last quoted. All the Iron made is promptly taken, with the possible exception of [off grades and that made by furnaces recently blown in, quality of which may be a little uncertain, but whether it be so or not prices have to be made something below the regular rate before it can be placed with any freedom. In the present condition of affairs nothing can be said beyond what has been said in recent reports—viz.: that prices are steady, that the demand is slow, but if the next turn in the market is to be in the direction of greater activity it will in all probability be also toward a further stiffening in values. We quote: No. 1 X Foundry, $25 to $25.50; No. 2 X Foundry, $23.25 to $24.25; No. 2 Plain, $22.25 to $22.75.

Pittsburgh.—The Pig Iron market is extremely quiet and hardly enough Iron is being sold to establish a price. It is, however, very strong. There is considerable Foundry Iron being sold and Southern brands are offered at $22.35 to $22 50, Pittsburgh. Northern Irons are higher and are being sold at $23 to $23.25, Pittsburgh. We quote: No. 2 Foundry, $22.35 to $22.50 for Southern, $23 to $23.25 for Northern and Bessemer, $24.90 to $25, f.o.b. Pittsburgh.

CHICAGO REPORT.

Old Metals.—While the supply of Scrap Iron is large and consumers are holding off, the dealers are maintaing a firm front and some prices are stiffer. Dealers quote buying prices as follows for full carloads, delivered on cars in Chicago:

	Per net ton.	Per lb.
Country Wrought Scrap	$14.00 to $15.00	.....
Machinery Cast	12.50	.....
Malleable Cast	12.00	.....
Stove Plate (free of burnt)	8.50	.....
Burnt Iron and Grate Bars	7.00	.....
Sheet Iron and Hoops	7.00	.....
Plow Steel and Breaking Stock	11.00	.....
No. 2, such as Shovels, Hoes, &c.	8.00	.....
Old Boilers—whole (Iron)	9.00	.....
Old Boilers (Iron)—cut in single Sheets and Rings	12.00	.....
Old Gas Pipe and Boiler Tubes	11.00	.....
Cast Borings	9.00	.....
Turnings	10.50	.....
Horseshoes	14.00	.....
Copper Wire and Heavy	....	14 c.
Copper Bottoms	....	12 c.
Copper Clips	....	13 c.
Red Brass	....	13 c.
Yellow Brass	....	10 c.
Red Brass Borings	....	11 c.
Yellow Brass Borings	....	9 c.
Light Brass	....	7½c.
Pipe Lead	....	3¾c.
Tea Lead	....	3½c.
Zinc	....	3¼c.
Rubber Shoes	....	8 c.
Rubber Car Springs, &c	....	4 c.
Inside Bicycle Tubing	....	18 c.
Outside Tubing	....	5½c.
Garden Hose	30.00	.....
Air Brake Hose	50.00	.....

Anthracite.—The demand is light. Chestnut is still scarce and held at $6, Chicago. Carload lots are quoted as follows, per net ton:

	Grate.	Egg and Stove.
Chicago, Ill.	$5.50	$5.75
Milwaukee, Wis.	5.50	5.75
St. Louis.	5.75	6.00
Kansas City, Mo.	7.50	7.75
Council Bluffs, Iowa.	7.50	7.75
Lincoln, Neb.	7.65	7.90
Sioux City, Iowa.	7.90	8.15
Aberdeen, S. D.	8.75	9.00
Dubuque, Iowa.	6.80	7.05
Madison, Iowa.	7.00	7.25
St. Paul, Minn.	8.00	8.25
Burlington, Iowa.	7.00	7.25
Des Moines, Iowa.	7.50	7.75
Davenport, Iowa.	6.80	7.05
St. Joseph, Mo.	7.50	7.75
Leavenworth, Kan.	7.50	7.75
Omaha, Neb.	7.50	7.75

THE HARDWARE TRADE.

IT is too early as yet to expect trade to have acquired much volume, but the year certainly opens with an excellent feeling and as much business as could be expected. There is a good deal of inquiry in regard to goods and a testing of the market on the part of prospective buyers, the result generally being the discovery of a firm and confident tone, and only in a few lines anything of a disposition to make concessions in price. With the revision of quotations, which is made at the opening of the year, after ascertaining the results of last year's business, a good many advances are being made by manufacturers, most of them of moderate extent and under the pressure of increased costs owing to the condition of the Iron market, and more particularly to their contracts for raw material, many of them being obliged to make new arrangements for their supplies. Where they have been selling the goods on the basis of low priced Iron and are now compelled to purchase at market rates, there is obviously substantial reason, especially in relatively heavy goods, for announcing higher prices. The matter of wages, too, is having its influence. While there has not been any general advance many manufacturers are paying higher wages to their workmen. The next week or two, it is expected, will develop more active business than is now doing, as travelers generally are soliciting orders, and the time has come when a good many jobbers and retailers will be completing their preparations for the season's trade. That the business will be of large volume is the confident expectation. The prosperity which prevails, as shown in the volume of business done by the retail trade throughout the country generally, and the fact that labor of nearly all kinds is well employed, indicate that there will be a large demand for goods. This will, however, doubtless be interfered with to some extent by the high prices, which tend to repress enterprise in some directions and to restrict sales. The continuance of a large export demand is one of the prominent features of the situation, especially as this demand, if looked after and taken care of, will undoubtedly assume much larger proportions. The attention which is given to it is one of the excellent indications of the present situation.

NOTES ON PRICES.

Plumbers' Supplies.—There seems to be no let up in the activity in this branch of trade. Jobbers report a remarkably brisk business for the season, especially in the large cities, where a great deal of building of a large sort is going on. Some big contracts are being figured on for Plumbing Supplies for large apartment houses and business buildings now in course of erection or about to be built in New York City. There is also a considerable amount of repair work and renewals going on Prices meanwhile are firm, and while no special changes were recorded in the past week there are indications of early advances in more than one line of goods, particulars of which follow. A number of manufacturers announce a withdrawal of prices on their products and the general tendency of the market appears to be steadily upward. There is every prospect of a continuance of good business for an indefinite period.

Sheet Brass, Brass Wire, &c.—The manufacturers of Roll and Sheet Brass, Brass Wire, &c., announced on January 10 a reduction of 5 per cent. in the price of these goods. The present discount on Sheet and Wire in small lots is 15 per cent.

Brazed Brass Tubing.—A similar reduction was also made in the price of Brazed Brass Tubing, on which the retail discount now is 25 per cent.

Roofing Slate.—Under date of January 10, 1900, John Galt & Sons, 253 Broadway, New York, issued the following revised price-list on Roofing Slates, the quotations applying to carload lots of 48 squares or more, f.o.b. cars at quarries:

No. 1 Genuine Bangor.	No. 1 Bangor Ribbon.	No. 1 Pen Argyl known as Albion Jackson Bangor.	No. 1 Penna. Black.	No. 1 Chapman Keystone Quarry.	No. 1 Peach Bottom.	No. 1 Eureka Unfading Green.	No. 1 Sea Green.	Intermediate Sea Green.	No. 1 Red.
2 4x14, 24x12, 22x12, 12x 8, 12x10, 11x10 — $3.30	24x14, 24x12 — $2.85	20x11, 20x10, 18x10, 18x 9, 16x10, 16x 9, 16x 8 — $3.75	20x11, 20x10, 18x10, 18x 9, 16x10, 16x 9, 16x 8 — $3.50	12x 6, 12x 7 — $3.25	24x14, 24x13 — $5.10	24x12, 22x12, 20x12, 18x11, 14x10, 14x 9 — $3.75	20x10, 18x10, 24x12, 22x12, 22x11, 20x12, 20x11	24x12, 22x12, 22x11, 20x12, 20x11, 20x10 — $2.55	20x10, 18x10, 18x 9, 16x10, 16x 9, 16x 8 — $11.00
2 2x11, 2 0x12, 18x12, 16x12 — 3.50	22x12, 22x11, 20x12, 18x12 — 3.00	22x12, 22x11, 20x12, 18x12, 16x12 — 3.50	22x12, 22x11, 20x12, 18x12, 16x12, 14x10 — 3.25	14x 7 — 3.75	24x12, 22x12, 22x11, 20x12 — 5 25	18x12, 16x12, 14x12, 12x 8, 12x 7, 12x 6 — 3.50	18x12, 18x11, 18x 9, 28x14, 26x14, 24x14, 22x14, 20x14 — $3.15	18x12, 18x11, 18x10, 18x 9	14x10, 14x 9, 14x 8, 14x 7
14x10, 14x 8, 14x 7 — 3.50	14x10, 14x 8, 14x 7	24x14, 24x12, 14x10, 14x 8, 14x 7 — 3.25	24x14, 24x12, 14x 8, 1.x 7 — 3.10	14x 8, 16x 9, 16x10, 18x 9 — 4.00	20x11, 18x12, 16x10, 14x10 — 4.00	14x 8, 14x 7 — 4.00	16x12, 16x10, 16x 9, 16x 8 — 2.95	24x14, 22x14, 20x14, 16x12 — 2.45	12x 8, 12x 7 — 9.50
16x10, 16x 9 — 3.85	16x 8	No. 2 Ribbon. 24x12, 22x11, 20x10, 18x 9, 16x 8, 14x 9 — 2.25	12x 8, 12x 7, 12x 6 — 2.80	20x10, 18x10, 18x 9, 16x 8, 14x14 — 4.00	20x12, 18x10, 20x10, 20x11 — 4.25	20x10, 18x 9, 16x 9, 16x 8 — 4.25	14x12, 14x10, 14x 9, 14x 8 — 2.85	16x10, 16x 9, 16x 8, 14x12, 14x10, 14x 9, 14x 8 — 2.35	12x 6 — 9.00
20x10, 18x10, 18x 9, 16x 8, 18x18, 16x16, 14x14 — 4.00	24x12, 22x11, 20x10, 18x 9, 16x 8, 14x 9 — 2.25	12x 8, 12x 7, 12x 6 — 3.00	12x 8, 12x 7, 12x 6 — 2.80	24x12, 11x22, 14x 7 — 3.35	18x10, 16x10, 22x11 — 4.00	14x 8, 14x 7 — 5.10	14x 7, 12x10, 12x 9, 12x 8 — 2.60	14x12, 14x10, 14x 9, 14x 8 — 2.35	10x 8, 10x 7, 10x 6 — 7.00
12x 7, 12x 6 — 3.00				8x14 — 3.40	12x 8, 12x 7 — 4.85	12x10, 12x 9, 10x10, 10x 9, 10x 8 — 3.25			
				9x16, 9x18, 10x18, 10x20 — 3.50	12x 6 — 4.75				
				8x16 — 3 55					
				No. 2 Chapman. 14x 7, 14x 8, 16x 8, 16x 9, 18x 9, 20x10, 22x11, 24x12 — 2.80		10x 7, 10x 6, 10x 5 — 3.00	12x 7, 12x 6 — 2.50		

Tinware.—The demand is much better for Tinware and House Furnishing Goods generally. The advance in cost to the consumer does not seem to be checking the demand to any appreciable extent. Prices are quite well maintained all around and there is a talk of further advances in some lines in the near future. Pieced Tinware has been marked up about 5 per cent.

Drawn Lead Traps.—Owing to the continued rise in the price of Pig Lead it is announced that an early advance in the price of Drawn Lead Traps and Bends is impending. This advance will include the Standard or Light Weight, Special or Medium Weight and the Extra Heavy Weight Traps and Bends of all styles and sizes mentioned in the standardized price-list issued August 2, 1897.

Enamelite Bathtubs.—The manufacturers of Enamelite Bathtubs have again come together and closed up the market on this class of goods. They have confirmed the prices which were in vogue prior to the breaking open of the market.

Sanitary Enamel Ware.—That the consolidation of the Enamel Bathtub interests is having its effect upon prices is evident from the fact that nearly all the jobbers in the Eastern territory have advanced prices on all classes of Enameled Ware. Several of the jobbers in New York City were skeptical of the success of the combination, but since the first of the year they have accepted the inevitable and have advanced prices in accordance with those of the various manufacturers issued on December 18, 1899. It is not expected that there will be any change in these prices in the near future. The only thing to be expected immediately is a notification of a freight differential to those dealers who may choose to use the goods manufactured by a distant plant to those of the plant in their immediate territory.

Galvanized Range Boilers.—Judging from the efforts of several of the members of the Galvanized Boiler Manufacturers' Association to secure orders for Galvanized Boilers and Air Tanks it may be reasonably inferred that the efforts of the promoters to consolidate these interests will bear fruit in the near future. There has been no advance in the price of these goods since January 1, 1899, but since then Pig Iron, the basis upon which all finished products are made, has advanced about 100 per cent. in price. Finished Iron in all shapes has advanced in price and wages were advanced recently in all branches of the iron industry. Higher prices for these goods may therefore be expected.

Wooden Tanks.—Under date of January 9 A. J. Corcoran, 192 Broadway, New York City, withdraws all previous quotations on Wooden Tanks. New prices on application.

Wrought Iron Pipe.—The market on Wrought Iron Pipe shows a difference of about 10 per cent. between Galvanized and Black Pipe, Glvanized being the weaker of the two. Discount of 40 to 45 per cent. still rules on Black Pipe, while Galvanized Pipe is quoted at 45 to 50 per cent. discount.

Wire Cloth.—Wire Cloth is being freely bought, as the opinion prevails that the retail selling season will show a short supply; $1.50 is now the ruling price. Window Screens and Screen Doors are also moving very freely.

Wire Nails.—Local conditions in the Wire Nail market remain unchanged. Orders are largely restricted to small lots, but these are frequent, so that the aggregate results in satisfactory sales for this season. Stocks of Nails in jobbers' hands purchased before the advance still cause irregular prices for small lots from store, which are quoted at $3.50 to $3.75.

Old Rags, Paper, &c.—The market is described as fairly active and prices firm. Dealers in New York are paying about the following rates:

No. 1 White Rags	per lb.	2⅝c.
No. 2 White Rags	per lb.	1⅝ to 1⅞c.
Mixed Rags	per lb.	1⅛ to 1¼c.
Blues and 3ds	per lb.	1⅛ to 1¼c.
Hard Sized White Shavings	per lb.	2⅛ to 2¼c.
No. 1 White Book Shavings	per lb.	2 to 2⅛c.
No. 2 White Book Shavings	per lb.	1½ to 1⅝c.
Light Book Shavings	per lb.	¾ to ⅞c.
No. 1 Mixed Shavings	per lb.	1¼ to 1⅜c.
No. 2 Mixed Shavings	per lb.	⅝ to ½c.
No. 1 Printed Books	per lb.	1⅛ to 1¼c.
Ordinary Mixed Books	per lb.	¾ to ⅞c.
Newspapers	per lb.	½ to 3-5c.
No. 1 Manila Paper	per lb.	¾ to ⅞c.
No. 2 Manila Paper	per lb.	½ to ⅝c.
Common Paper	per lb.	⅜c.
Straw Chips	per lb.	⅜c.
Binders' Clippings	per lb.	¼ to ⅜c.
Jute Butts	per lb.	1⅛ to 1¼c.
No. 1 Jute Bagging	per lb.	¾ to 1 c.
Mixed Bagging	per lb.	½ to ¾c.
No. 2 Bagging	per lb.	½ to ¾c.
Hemp Twine	per lb.	1⅜ to 1¾c.
Manila Rope	per lb.	1¾ to 2 c.
Jute Rope	per lb.	1½ to 1¾c.
Mixed Rope	per lb.	¾ to ⅞c.

Old Rubber.—The market shows continued firmness. About the following prices are paid by dealers in New York City and nearby points:

Car Springs, ton lots, per lb	4 c.
Rubber Shoes, carloads, delivered at factory, per lb	8½ to 9½c.
Rubber Shoes, less than carloads, per lb	8 to 9 c.
White Wringer Rolls, per lb	7½c.
White Syringes, per lb	7½c.

CONTENTS.

Editorials—	PAGE.
The Enameling of Iron	27
Request for Catalogues for the Paris Exposition	27
Failures in 1899	27
Heavy Fire Losses	28
Furnace Heating. Illustrated	29
Piece Price or Day's Work in the Foundry	31
Jewel Gasoline Stoves	31
Martin L. Hull	31
Hoffman's Compendium of Furnace Work	31
Traveling Salesmen for 1900	32
The Lawrence Odorless Hot Plates	32
The O K Stove & Range Company	32
Odd Plates	32
Stove and Hardware Dealers	33
Enameling Cast Iron.—I	34
Brooklyn Branch of Association of Master Plumbers of New York	36
Montreal Master Plumbers	36
Jersey City Master Plumbers	36
American Pipe and Foundry Company	36
Frozen Boiler Connections	36
Thermostat for Natural Gas. Illustrated	37
Unsanitary Manila	37
National Die Stock. Illustrated	38
The American Society of Heating and Ventilating Engineers	38
The Carbon Club	38
An Art Casting	38
New York City Notes	38
Blake Combination Pipe Vises. Illustrated	39
The Plumber's Apprentice	39
Heating and Plumbing Notes	40
Cincinnati Stamping Company	41
A Fine Enameled Ware Plant. Illustrated	42
The Chicago Drainage Canal	43
Manual Training in Germany	44
A New Anti-Freezing Liquid	44
How they Used to Make Pieced Pans in the Long Ago	45
The Sheet Combine Movement	
The Welsh Tin Plate Trade in 1899	45
National Sheet Metal Furniture. Illustrated	46
Henry W. Merchant	46
The Welsh Tin Plate Wage List of 1874	46
Concentrating Tin Plate Works	46
Flashings	47
Scrap	47
Trade Notes	47
The Letter Box—	
Furnace Fails to Heat the Church	48
Removing Rust from Tinners' Tools	49
What is the Trouble with Copper for Gutter ?	49
Heating a Tank. Illustrated	49
A Scrap Book Habit	49
Information Wanted About a Furnace Job	5 (
Iron Cement	50
Trade Report—	
Market Summary	51
Metal Market	51
The Pig Iron Market	52
Chicago Report	52
Notes on Prices	53
The Hardware Trade	53
Metal and Miscellaneous Prices	5
Labor Exchange—	
Help and Situations Wanted	50

ROOFING SUPPLIES, METALS, TIN PLATES, &c.

REVISED JANUARY 12, 1900.

The following New York quotations are for small lots:

Aluminum—

No. 1 Aluminum (guaranteed over 99% Pure), in ingots for remelting.
Small lots.....₩ lb, 37¢
100-lb lots.....₩ lb, 35¢
Aluminum Sheet, B. & S. gauge.
in lots of 50 lbs or more.

	6-in.	14-in.	24-in.	30-in.
Wider than.....				
And including.....	14-in	24-in.	30-in.	
	₩ lb.	₩ lb.	₩ lb.	
Nos. 18 to 19.....	$0.42	$0.44	$0.47	
" 20.....	.44	.46	.49	
" 21 to 23.....	.46	.48	.51	
" 24.....	.48	.50	.53	
" 25.....	.47	.51	.54	
" 26.....	.47	.54	.59	
" 27.....	.48	.57	.62	
" 28.....	.48	.57	.64	
" 29.....	.49	.60	.69	
" 30.....	.50	.64	.77	

Note.—Lots of less than 50 lbs 5¢ ₩ lb extra.

Antimony—

Cookson.....₩ lb. 11½¢
Hallett's.....₩ lb, 10½¢
U. S.....₩ lb, 10½¢

Brass—Planished.....net

Roll and Sheet.....15% off

Brass and Copper Tubes

Brazed Brass Tubing—

Brown & Sharpe's Gauge the Standard.

List Feb. 26, 1896.

Plain Round Tube.	Per lb.
½-in. up to ⅝-in.	$0.35
¾-in. up to ¾-in.	.36
⅞-in. up to 1-in.	.38
1¼-in. up to 1½-in.	.41
1¾-in. up to 2-in.	.48
2 1-16-in. up to 3-in.	.65
3 1-16-in. up to 4-in.	1.00
4½-in. up to 8-16-in.	1.50
Smaller than ½-in.	Special
9-in. and larger	Special
9-in. to 8-in. to No. 19, inclusive.	.38

30% off.

Copper & Bronze Tubing—

3¢ ₩ lb more than Brass.

Conductors—

Corrugated. *Round or Square.*—

Galvanized ½ or more. N'st'd. 60&20&2½%
" Less than ½, Nested..... 60&20%
" Locked Joints, ½ or more, Nested..... 60&20&2½%
Galvanized Locked Joints, less than ½, Nested..... 60&20%

Spiral Riveted.

Galvanized.....40%
See also Elbows and Shoes; Eave Trough Miters; Strainers, Conductor.

Conductor Strainers—See *Strainers, Conductor.*

Copper—

Bottoms, Pits and Flats ₩ lb 26½¢ basis
Lake Ingot.....17½¢
Ansonia Grade Casting.....16½¢
Planished.....net
Sheet and Bolt.....22½¢ ₩ lb basis

Tubes—See *Seamless Brass Tubes*

Eaves Troughs—

List Feb. 1, 1895.

Lap or Slip Joint, Galvanized, in crates 75&10%

Eave Trough Mitres—

Lap or Slip Joint.....list, 25%

Elbows—Plain Adjustable—

Eastern List.

Tin.....30%
Galvanized.....30%

Stove Pipe—

New York Four-Piece.

	4	4½	5	5½	6-inch.
No. 1.	80	.85	.90	1.00	1.05 per doz
No. 2.	.65	.70	.75	.80	.85 "
No. 3.	.60	.63	.65	.70	.80 "

Elbows and Shoes—

Corrugated

Round or Square.

Galvanized.....60%

Gasoline—See *Petroleum Products.*

Iron, Sheet—*Black.*

	Common American.	R. G. Cleaned American.
Nos. 10 to 16.....₩ lb, 3.20....		3.20¢
Nos. 17 to 21.....₩ lb, 3.25...		3.30¢
Nos. 22 to 24.....₩ lb, 3.30....		3.40¢
Nos. 25 and 26...₩ lb, 3.35....		3.45¢
No. 27 .....₩ lb, 3.40....		3.50¢
No. 28 .....₩ lb, 3.45....		3.60¢

Russia, Planished, &c.

Genuine Russia, according to assortment.....₩ lb 10½¢
Do. Stained.....6¢@10¢
Patent Planished ₩ lb A, 10½¢; B, 9½¢ net

Galvanized.

Nos. 10 to 16.....₩ lb, 12¢	70&5@70&10% off.
Nos. 17 to 21.....₩ lb, 13¢	
Nos. 22 to 24.....₩ lb, 14¢	
Nos. 25 to 26.....₩ lb, 15¢	
No. 27.....₩ lb, 16¢	
No. 28.....₩ lb, 17¢	
No. 29.....₩ lb, 19¢	
No. 30.....₩ lb, 21¢	
36 in. 1¢ ₩ lb higher	

Kerosene—See *Petroleum Products*

Lead—

American Pig.....5½@5¼¢
Bar.....5¾¢
Pipe (full coils and lengths).....7 ¢
Pipe (cut coils and lengths).....7½¢
Tin Lined Pipe.....12½¢
Block Tin Pipe.....37½¢
Sheet Lead (full rolls).....8 ¢
Sheets (cut rolls).....9 ¢
Old Lead in exchange, 4½¢ ₩ lb.

20% off.

Mitres, Eave Trough—See *Eave Trough Mitres.*

Nickel—

Per lb.....40@42¢

Paints, Oils, &c.—

Lead, White, Atlantic and Jewett's. 7½¢
Lead. Amn. White, in oil.....7½¢
Lead, Red, bbls. and ½ bbls.....7½¢
Lead, Red, kegs.....7½¢
Linseed Oil:
Raw, ₩ gal.....54¢
Boiled.....56¢
Spirits Turpentine:
In bbls.....54¢
In cases.....62¢
Putty:
In barrels and ½ bbls.....2¼¢
In tubs.....2¼¢
In tin cans.....3¼¢
In bladders.....2¾¢

Palm Oil. 1500 lb casks.

Fancy Lagos.....₩ lb 5½¢
Clarified.....₩ lb 4¾¢
Accra.....₩ lb 4½¢
Half Jack.....₩ lb 4½¢

Petroleum Products—

In Barrels (Barrel Included)
Stove Gasoline.....₩ gal. 13@14¢
Kerosene.....₩ gal. 12¾@13¢

Pipe, Drain.....50%

Pipe, Spiral—See *Conductors.*

Registers—

List Feb. 1, 1899.
Black Japanned.....30%
White Japanned.....25%
Nickel Plated.....30&10%
Bronze Finishes in Imitation of Gold, Silver, Copper or Bronze.....30%
Electroplated in Brass, Bronze or Copper.....30&10%
White Porcelain.....20%
Solid Brass and Bronze Metal.....20%

Roofing Material—

Asphaltum, Trinidad Refined, ₩ ton.....$30.00@$35.00
Asphaltum, Rock, ₩ ton.....$14.00
Heavy Single Ply Tar Felt.....₩ lb 2½¢
2 Ply Roofing Felt, ₩ roll, 108 sq. ft. $1.30
3 Ply Roofing Felt, ₩ roll, 108 sq. ft. 1.70
Roofing Pitch ₩ bbl.....$2.40@$2.50

Rosin

(Barrels of 280 lb. Barrels weigh actually about 400 lb).
Common and Good—Strained.
Rosin, C. & D.....₩ bbl. $1.60 @$1.65
Rosin, E. & F.....₩ bbl. 1.70 @ 1.75
Rosin, G. & H.....₩ bbl. 1.80 @ 1.85
Rosin, I. & K.....₩ bbl. 1.95 @ 2.15
Rosin, M. & N.....₩ bbl. 2.50 @ 2.95

Seamless Brass Tubes—

Net List, February 6. 1899.

Shoes and Elbows—See *Elbows and Shoes.*

Slate Roofing—

According to size, f. o. b. cars, Quarry Station.
Pennsylvania:
Best Bangor, ₩ sqr.....$3.00@$4.00
No. 1 Bangor Ribbon, ₩ sq 2.85@ 3.25
Pen Argyle, ₩ sqr.....3.00@ 3.75
Peach Bottom, ₩ sqr.....4.75@ 5.35
No. 1 Penna. Black, ₩ sqr. 2.80@ 3.50
No 1 Chapman Keystone ₩ sqr.....3.25@ 4.25
Vermont:
Sea Green, ₩ sqr.....$2.50@$3.15
Purple, ₩ sqr.....3.75@ 4.25
Unfading Green, ₩ sqr...3.00@ 4.25
Red, ₩ sqr.....7.00@11.00
Maine:
Brownville, Unfading Black:
No. 1 quality.....$5.00@6.50
No. 2 quality.....$4.00@5 50

Solder and Soldering Fluids—

Solder—

½&½ guaranteed.....18@19¢
No. 1.....15½@16¢
Prices of Solder indicated by private brands vary according to composition.

Soldering Fluids—

Acme Soldering Flux.
Per gal.....60¢
Concentrated Soldering Flux.
f. o. b. New York.
In barrels. ₩ lb.....4¢
Smaller quantities, ₩ lb.....5¢
Eureka Soldering Flux—Triple Strength
In barrels, ₩ lb.....3 ¢
Smaller quantities, ₩ lb.....3½¢
Eureka Soldering Flux—Extra Concentrated
In barrels, ₩ lb.....4¼¢
Smaller quantities, ₩ lb.....5 ¢
Eureka Soldering Flux—Crystal.
In 100-lb cases, ₩ lb.....7¢
Gedney's Soldering Fluid.
In carboys or barrels, ₩ lb.....2¢
$1.50 for carboy or barrel; money refunded when returned.
Kester's Soldering Salts.
Half-lb can.....25¢
1-lb can.....50¢
5-lb can.....$1.50
Lennox Soldering Fluid.
In barrels, ₩ lb.....2¢
In carboys. ₩ lb.....3¢
Perfection Soldering Flux.
No charge for package.
Bbls. about 500 lb, ₩ lb.....3¢
½ bbls., about 300 lb, ₩ lb.....3½¢
Kegs, about 110 lb, ₩ lb.....3½¢
Kegs about 55 lb, ₩ lb.....4¢
Yager's Soldering Salts.
1 lb bottles, each.....60¢
5 lb bottles, ₩ lb.....40¢

Soldering Coppers—

Per lb.....21½@22½¢

Spelter—

Western Spelter.....5¼@5½¢

Spiral Pipe—See *Conductors.*

Stove Pipe Elbows—See *Elbows, Stove Pipe.*

Stove Trucks—See *Trucks, Stove.*

Strainers, Conductor—

Galvanized.....50%

Tin Pigs and Bars—

Banca, Pigs, ₩ lb.....28¢
Straits, pigs, ₩ lb.....27¢
Straits, in bars, ₩ lb.....28¢

Tin Plates, American

Charcoal Plates, Bright—

N. B.—The price of 20 x 28 sizes is double the price of 14 x 20.

Calland Grade:		
IC,	14 x 20.....	$7.50
IX,	14 x 20.....	9.00
IXX,	14 x 20.....	10.25
IXXX,	14 x 20.....	11.50
IXXXX,	14 x 20.....	12.75
Melyn Grade:		
IC,	14 x 20.....	7.00
IX,	14 x 20.....	8.50
IXX,	14 x 20.....	9.75
IXXX,	14 x 20.....	11.00
IXXXX	14 x 20.....	12.25
Allaway Grade:		
IC,	14 x 20.....	6.15
IX	14 x 20.....	7.25
IXX,	14 x 20.....	8.35
IXXX,	14 x 20.....	9.45
IXXXX,	14 x 20.....	10.55

Coke Plates, Bright—

Bessemer Steel, or equal to J. B. Grade, full weight } IC, 14 x 20.....$5.30@5.40
" IX, 14 x 20.....$6.25@6.30

N. B.—The reduction per box on lighter Plates than IC, 14 x 20, is as follows:

100 lb	15¢
95 lb	20¢
90 lb	25¢
85 lb	30¢

Terne Plates

N. B.—The following prices are for IC, 20 x 28, the rate for 14 x 20 being half as much. IX is usually held at $2 per box advance:

About 40 lb coating	$16.25@16.75
About 80 lb coating	14.50@15.00
About 20 lb coating	13.00@14.00
About 15 lb coating	11.50@12.00
About 8 to 10 lb coating	10.50@10.75

Boiler Plates, American—

IXX, 14 x 26..(112 sheets).....$13.00
IXX, 14 x 28..(112 sheets).....14.00
IXX, 14 x 31..(112 sheets).....15.50

Troughs Eave—See *Eave Trough*

Trucks, Stove—

Improved Lock Frame, per doz...$15.00
Steel Lock Frame, per doz.....18.00
Daisy Improved pattern, ₩ doz...18.00

Tubing—

Tin.....50% | Galvanized.....50%
Fittings for do.....40%

Zinc—

600 lb casks ₩ lb.....7¾¢
Per lb.....8@8½¢

PLUMBERS' AND STEAM FITTERS' SUPPLIES.

Fittings—

List of Oct 7, 1899.

Cast Iron Fittings, Black and Galvanized, Standard sizes.....55%
Cast Iron Bushings and Plugs.....55%
Cast Iron Flanges.....55%
Malleable Iron Fittings.....35@40%
" " Bushings.....55%
" " Unions.....55%
Wrought " Nipples.....50@55%
" " Couplings.....55%
" " Long Screws.....60%

Cast Iron Soil Pipe—

2 to 6 inch inclusive.

Standard.....45%
Extra Heavy.....50%
All Fittings.....55%

Wrought Iron Pipe—

List Feb. 22, 1899.

⅛ and less, Plain	40@45%
⅛ and less, Galv.	45@50%
¼ and larger, Plain	40@45%
¼ and larger, Galv.	45@50%
Screw and Socket Joint Casing	45@45&10%
Inserted Joint Casing	40&10@45%

Valves, Cocks, &c.—

Iron Body Valves	60&10%
Air Cocks and Radiator Air Cocks	60&10%
Soldering Unions	60&10%
" Nipples	60&10%
Brass Unions (Rough and Finished)	60%
Jenkins Bros.':	
Iron Body Valves, except Gate Valves	55%
All Iron Valves, except Gate Valves	40%
Iron Body Gate Valves	50%
All Iron Gate Valves	35%
Iron Cocks, all Iron	60&10%
" " with Brass Plugs	60%
Brass Globe, Angle and Cross Valves	50&10%
" and Angle Valves, hose outlet	50&10%
Brass Garden Hose Valves	50&10%
" Horizontal, Vertical and Angle Check Valves	50&10%
Brass Safety Valves	55%
" " " Low Pressure	55%
" Radiator Valves	65%
" " Jenkins	55%
Brass Jenkins' Globe, Angle, Cross and Corner Valves	55%
Brass Jenkins' Safety and Check Valves	40%
Brass Jenkins' Gate Valves	50%
Brass Steam Cocks	50&10%
" Gas Meter and Union Meter Cocks	50&10%
Brass Fittings, Rough	60%
" " Finished	60%
" Bushings	60%

Plumbers' Brass Work—

List of December 7, 1896.

Ground Key Work:	
Rough	55@60%
Finished	50@55%
Compression Work	50@55%
Chain Stays	55%
Iron Boiler Couplings, Ground Face, per set	$1.00
Basin Plugs	50&10%
Sink or Bath and Wash Tray Plugs	50&10%
Basin Clamps	40@80¢ ₩ doz. net

Bath Tubs—

Copper Lined Bath Tubs.....35%
Galvanized Steel Enamel Bath Tubs, list of February 1, 1899....50@50&10%
Steel Clad Copper Lined Bath Tubs, list of Feb. 1, 1899.....40@45%
Porcelain Lined Iron Bath Tubs.....20%
Solid Copper, list of Feb. 1, 1899.....20%

Boilers—

Standard Boilers:
30, 35 and 40 gal.....60&5%
Other sizes up to 52 gal.....55&5%
53 gal and above.....45&5%
Extra Heavy Boilers:
18 to 52 gal.....50%
53 gal. and above.....40&10%

Sinks—

Cast Iron—

High list.....55@60%
Low list.....50@50&10%

Wrought Steel—

Columbus, Galv'd and Enameled.....45%
Columbus, Painted.....30%
L. & G.....50%

Miscellaneous—

Earthenware, List of July 17, 1899.....Basins, Urinals and Hoppers.....40%
Closet Bowls, Sundries, Washouts and Pedestals.....40%
Drawn Lead Traps, List of Aug 2 1897.....55&40%

CLASSIFIED LIST OF ADVERTISERS.

Acetylene Gas Burners.
State Line Talc Co., Chattanooga Tenn

Acetylene Gas Generators.
Condon, John, Philadelphia, Pa.
Giessel, Henry & Co., Chicago.
International Heater Co., Utica, N. Y.
Mechanical Engineering Construction Co., 63 5th Ave., N. Y.

Advertisement Writer.
Maule, Francis, I., Philadelphia, Pa.

Agate Ware.
Lalance & Grosjean Mfg. Co., 19 Cliff St., N. Y.

Aluminum Ingots.
Janney, Steinmetz & Co., Phila., Pa.

Aluminum Scrap Buyers.
Janney, Steinmetz & Co., Phila., Pa.

Aluminum Sheets.
Janney, Steinmetz & Co., Phila., Pa.

Aluminum Ware.
Hill, Whitney & Wood Co., Waltham, Mass.

Architectural Ornaments.
Frand, Martin J. & Co., Camden, N. J.
Friedley & Voshardt, Chicago, Ill.
Missouri Sheet Metal Ornament Co., St. Louis, Mo.

Bathroom Specialties.
Frank & De Keyser, 172 Fulton Street, N. Y.
Silver & Co., Brooklyn, N. Y.

Bathtubs.
Ahrens & Ott Mfg. Co., Louisville, Ky.
Wheeler, E. S. & Co., New Haven, Ct.

Beer Pumps.
I. X. L. Beer Pump Co., Phila., Pa.

Black Plates.
American Tin Plate Co., Chicago, Ill.

Brass Goods.
American Pin Co., Waterbury, Conn.

Brass Sheets, Rolls, &c.
Hungerford, U. T. Brass & Copper Co., 121 Worth St., N. Y.

Burners, Acetylene.
State Line Talc Co., Chattanooga, Tenn

Can Makers' Tools and Machines.
Bliss, E. W. Co., Brooklyn, N. Y.
Gordon, W. J., Phila., Pa.
Niagara Machine & Tool Wks., Buffalo, N. Y.
Robinson, J. M. & Co., Cincinnati, O.
Stiles & Parker Press Co., Brooklyn, N. Y.
Toledo Machine & Tool Co., Toledo, O.

Castings, Iron.
Cheney, S. & Son, Manlius, N. Y.

Ceilings, Metallic.
American Corrugating Co., St. Louis, Mo.
Berger Mfg. Co., Canton, O.
Brooklyn Metal Ceiling Co., Brooklyn, N. Y.
Canton Steel Roofing Co., Canton, O.
Eller, J. H. & Co., Canton, O.
Friedley & Voshardt, Chicago, Ill.
Kanneberg Roofing Co., Canton, O.
Missouri Sheet Metal Ornament Co., St. Louis, Mo.
New York Iron Roofing & Cor. Co., Jersey City, N. J.
Vogan & Strauss, Kenosha, Wis.

Cellar Drainers.
Kemp, C. M. Mfg. Co., Baltimore, Md.

Chimney Top Ventilators.
Iwan Bros., Streator, Ill.

Cocks, Ball, Basin and Stop.
Stebbins, E. Mfg. Co., Brightwood, Mass.

Coils.
National Pipe Bending Co., New Haven, Conn.

Combustion Regulator.
Æolipyle Co., 117 Beekman St., N. Y.

Conductor Pipe and Elbows.
Berger Bros. Co., Philadelphia, Pa.
Canton Steel Roofing Co., Canton, O.
Cincinnati Corrugating Co., Piqua, O.
Kanneberg Roofing Co., Canton, O.
Lawrence-Letts Elbow Co., Ltd., Waverly, N. Y.
McClure & Co., Pittsburgh, Pa.
Marlin & Co., Pittsburgh, Pa.
Reeves Iron Co., Canal Dover, O.
Souther, E. E. Iron Co., St. Louis, Mo.
Weyand, Henry, Waterbury, Ct.

Conductor Pipe Hangers.
Iwan Bros., Streator, Ill.

Cooking Utensils.
Hill, Whitney & Wood Co., Waltham, Mass.

Copper, Roofing and Cornice.
Gummey, McFarland & Co., Phila., Pa.
Hungerford, U. T. Brass & Copper Co., 121 Worth St., N. Y.

Cornice Machinery.
Double Truss Cornice Brake Co., Buffalo, N. Y.
Keene, Geo. C. & Co., Cincinnati, O.
Ohl, Geo. A. & Co., Newark, N. J.
Peck, Stow & Wilcox Co., 27 Murray St., New York.
Phila. Machine Tool Co., Phila., Pa.
Poorman Mfg Co., Piqua, O.
Robinson, J. M. & Co., Cincinnati, O.

Cornice Work, Galvanized Iron.
Garry Iron & Steel Roofing Co., Cleveland, O.
Marlin & Co., Pittsburgh, Pa.

Corrugating Machinery.
Poorman Mfg. Co., Piqua, O.

Couplings. (*See Pipe Couplers.*)

Cut Offs, Rain Water.
Cooney & Geiger, Indianapolis, Ind.

Dampers.
Greene, W. F., Troy, N. Y.
Troy Nickel Works, Troy, N. Y.

Deflectors.
Rutherford, J. & Son, Akron, O.

Die Stocks.
Curtis & Curtis, Bridgeport, Ct.
Fowler Automatic Draft Reg. & Vent. Co., Lawrence, Mass.

Drop Hammers.
Bliss, E. W. Co., Brooklyn, N. Y.
Toledo Mach. & Tool Co., Toledo, O.

Dumb Waiters.
Energy Mfg. Co., Phila., Pa.

Eave Troughs.
Berger Bros. Co., Philadelphia, Pa.
Berger Mfg. Co., Canton, O.
Eller, J. H. & Co., Canton, O.
Kanneberg Roofing Co., Canton, O.
Marlin & Co., Pittsburgh, Pa.
Souther, E. E. Iron Co., St. Louis, Mo.
Weyand, Henry, Waterbury, Ct.

Eave Trough Hangers.
Berger Bros. Co., Phila., Pa.
Berger Mfg. Co., Canton, O.

Eave Trough Machines.
Marlin & Co., Pittsburgh, Pa.

Elbows, Stove Pipe.
Hill, Jas. Mfg Co., Providence, R. I.
Howes, S. M. Co., Boston, Mass.
Lawrence-Letts Elbow Co., Ltd., Waverly, N. Y.
Souther, E. E. Iron Co., St. Louis, Mo.

Electric Dynamo Machines.
Hanson & Van Winkle Co., Newark, N. J.
Zucker & Levett & Loeb Co., 526-530 W. Twenty-fifth St., New York.

Enameled Ware.
Cleveland Stamping & Tool Co., Cleveland, O.
Lalance & Grosjean Mfg. Co., 19 Cliff St., New York.
Shepard, Sidney & Co., Buffalo, N. Y.

Estimate Books.
Mersick, C. S. & Co., New Haven, Conn.
Vanderman Plumbing & Heating Co., Willimantic, Conn.

Expansion Tanks.
Koven, L. O. & Bro., 18 Spruce St., N. Y.

Faucets.
Clark Novelty Co., Rochester, N. Y.
Litchfield, J. M., 105 Beekman St., N. Y.

Fire Brick.
Presbrey Stove Lining Co., Taunton, Mass.
Valentine, M. D. & Bro. Co., Woodbridge, N. J.

Fire Pots.
Burgess Soldering Furnace Co., Columbus, Ohio.
Clayton & Lambert Mfg. Co., Detroit, Mich.
Hull, M. L., Cleveland, O.
Indianapolis Steel Roofing & Cor. Co., Indianapolis, Ind.
Turner, W. W. & Co., Chicago, Ill.

Fire Sets.
Troy Nickel Works, Troy, N. Y.

Fittings, Plumbing.
Illinois Mall. Iron Co., Chicago, Ill.
Lawler Water Feed & Damper Regulator Co., 181 Mercer St., N. Y.

Floor Sleeves
Illinois Malleable Iron Co., Chicago, Ill.

Food Cutters.
Peck, Stow & Wilcox Co., 27 Murray St., N. Y.

Foot Warmers.
Knapp, F. H., Chicago, Ill.

Furnace Pipe and Fittings.
Hessler, H. E., Syracuse, N. Y.
International Heater Co., Utica, N. Y.

Furnaces and Heaters.
Barstow Stove Co., Providence, R. I.
Bergstrom Bros. & Co., Neenah, Wis.
Cory, Uzal & Co., 210 Water St., N. Y.
Dighton Furnace Co., Taunton, Mass.
Floyd, Wells & Co., Royersford, Pa.
Giblin & Co., Utica, N. Y.
Graff & Co., 208 Water St., N. Y.
Hart & Crouse Co., Utica, N. Y.
International Heater Co., Utica, N. Y.
Kelsey Furnace Co., Syracuse, N. Y.
Magee Furnace Co., Boston, Mass.
Mueller, L. J. Furnace Co., Milwaukee, Wis.
Schwab & Sercomb, Milwaukee, Wis
Sheppard, Isaac A. & Co., Phila., Pa.
Stamford Foundry Co., Stamford, Ct.
Superior Foundry Co., Little Falls, N. Y.
Tubular Heating and Ventilating Co., Phila., Pa.

Galvanized Ware.
Keen & Hagerty Mfg. Co. Baltimore, Md.

Gas Engines.
Condon, John, Philadelphia, Pa.

Gas Heaters. (*See Stoves and Ranges, Gas.*)

Gas Machines.
Giessel, Henry & Co., Chicago.
Kemp, C. M. Mfg. Co., Baltimore, Md.
Mechanical Engineering Construction Co., 63 5th Ave., N. Y.

Granite Ware.
Lalance & Grosjean Mfg. Co., 19 Cliff St., N. Y.

Grates.
Jackson, W. Son, 246 Front St., N. Y.
Fowler Automatic Draft Reg. & Vent. Co., Lawrence, Mass.

Hair Felt.
Young, Jos. H., Boston, Mass.

Heaters, Steam and Hot Water.
Barstow Stove Co., Providence, R. I.
Drake, W. H., Newark, N. J.
Gorton & Lidgerwood Co., 96 Liberty St., New York.
Gurney Heater Mfg. Co., Boston, Mass.
Hart & Crouse Co., Utica, N. Y.
International Heater Co., Utica, N. Y.
Magee Furnace Co., Boston, Mass.
National Pipe Bending Co., New Haven, Conn.
Sheppard, Isaac A. & Co., Phila., Pa.
Smith & Thayer Co., Boston, Mass.

Heat Regulators.
Æolipyle Co., 117 Beekman St., New York.
Howard Thermostat Co., Oswego, N. Y.

Hollow Ware.
Cleveland Stamping & Tool Co., Cleveland, O.
Lalance & Grosjean Mfg. Co., 19 Cliff St., N. Y.
Sperry, D. R. & Co., Batavia, Ill.

Hot Plates.
Odin Stove Mfg. Co., Ltd., Erie, Pa.

Hot Water Attachment.
Turner, W. W. & Co., Chicago, Ill.

Iron, Galvanized Sheet. (*See Sheets, Galvanized.*)

Iron, Planished Sheet.
Wood, W. D. Co., McKeesport, Pa.

Iron and Steel, Sheet. (*See Sheets, Iron and Steel.*)

Iron Shutters and Doors.
Garry Iron & Steel Roofing Co., Cleveland, Ohio.

Lamps.
Merkel, H., St. Louis, Mo.

Lanterns.
Berger Mfg. Co., Canton, O.

Lath, Metallic.
American Corrugating Co., St. Louis, Mo.
Schratwiesers Metal Lath Works.

Lead Pipe.
Colwell Lead Co., 63 Centre St., N. Y.

Lead Washers.
Littleford Bros., Cincinnati, O.

Lighting Apparatus.
Incandescent Light & Stove Co., Cincinnati, O.

Lightning Rods.
Washburns, E. G. & Co., 46 Cortlandt St., N. Y.

Lunch Boxes.
Seavey Mfg. Co., Boston, Mass.

Metal Ceilings. (*See Ceilings, Metallic.*)

Metals.
Trench, Stewart & Co., 73 Beekman St., N. Y.

Mica.
Munsell, Eugene & Co., 218 Water St., New York.
Palermo Mica Co., 115 Beekman St., N. Y

Milk Cans.
Shepard, Sidney & Co., Buffalo, N. Y.

Nickel Plating Machines.
Hanson & Van Winkle Co., Newark, N. J.
Zucker & Levett & Loeb Co., 526-530 W. Twenty-fifth St., New York.

Oil Heaters. (*See Stoves and Ranges, Oil, Vapor and Gasoline.*)

Ovens, Portable.
Adler, H. Co., Pittsburgh, Pa.
Monarch Stove & Mfg. Co., Mansfield, Ohio.

Patent Solicitors.
Howson & Howson, Philadelphia, Pa.
Stocking, E. B., Washington, D. C.

Patterns.
Cope, Geo. W., Detroit, Mich.
Gobeille Pattern Co., Cleveland, Ohio.
Remmers Pattern Co., St. Louis, Mo.
Vedder Pattern Wks., Troy, N. Y.

Perforated Sheet Metal.
Harrington & King Perforating Co., Chicago, Ill.

Pig Iron.
Wister, L. & R. & Co., Philadelphia, Pa.

Pipe Crimper.
Wheeler, W. A., Indianapolis, Ind.

Pipe, Water and Gas.
Tufts, Walter B., 96 John St. N. Y.

Plumbers' Tools, Specialties and Supplies.
Ahrens & Ott Mfg. Co., Louisville, Ky.
American Pin Co., Waterbury, Conn.
Barstow Stove Co., Providence, R. I.
Clayton & Lambert Mfg. Co., Detroit, Mich.
Colwell Lead Co., 63 Centre St., N. Y.
Heiland, Geo. W., 101 Beekman St., N. Y.
Illinois Malleable Iron Co., Chicago, Ill.
Lawler Water Feed & Damper Regulator Co., 181 Mercer St., N. Y.
National Pipe Bending Co., New Haven, Conn.
Stebbins, E. Mfg. Co., Brightwood, Mass.
Wheeler, E. S. & Co., New Haven, Ct.
Zero Valve & Brass Mfg. Co., Buffalo, N. Y.

Pokers and Lifters.
Stover Mfg. Co., Freeport, Ill.
Troy Nickel Works, Troy, N. Y.

Potato Masher.
Vogel, Wm. & Bros., 37 to 47 S. 6th St., Brooklyn, N. Y.

Presses and Dies.
Bliss, E. W. Co., Brooklyn, N. Y.
Ferracute Machine Co., Bridgeton, N. J.
Gordon, W. J., Philadelphia, Pa.
Miner & Peck Mfg. Co., New Haven, Conn.
Niagara Machine & Tool Wks., Buffalo, N. Y.
Phila. Machine Tool Co., Phila., Pa.
Robinson, J. M. & Co., Cincinnati, O.
Rudolphi & Krummel, Chicago, Ill.
Stiles & Parker Press Co., Brooklyn, N. Y.

Punching Machines.
Bertsch & Co., Cambridge City, Ind.
Bliss, E. W. Co., Brooklyn, N. Y.
Clough, R. M., Tolland, Conn.
Robinson, J. M. & Co., Cincinnati, O.
Toledo Mach. & Tool Co., Toledo, O.

Radiators, Steam and Hot Water.
Gurney Heater Mfg. Co., Boston, Mass.

Radiators, Warm Air.
Ross Radiator Co., Newburgh, N. Y.

Range Boilers.
Koven, L. O. & Bro., 18 Spruce St., N. Y.

Reflectors.
Frink, I. P., 551 Pearl St., New York.

Refrigerators.
Baldwin Refrigerator Co., Burlington, Vt.
Grand Rapids Refrigerator Co., Grand Rapids, Mich.
Gurney Refrigerator Co., Fond du Lac, Wis.

Registers.
Dighton Furnace Co., Taunton, Mass.
Highton, Wm. & Sons, Boston, Mass.
Independent Register Co., Cleveland, Ohio.
Michigan Barrel Co., Grand Rapids, Mich.
Philadelphia Hardware & Malleable Iron Works, Phila., Pa.
Schwab & Sercomb, Milwaukee, Wis.
Seavey Mfg. Co., Boston, Mass.
Walworth Run Fdry Co., Cleveland, O.

Roasters and Bakers.
Shepard, Sidney & Co., Buffalo, N. Y.

Roof Gutters.
Tucker Mfg. Co., Newark, O.

Roofing Cement and Paint.
Dixon, Jos. Crucible Co., Jersey City, N. J.

Roofing and Siding, Iron and Steel, Corrugated and Plain.
American Corrugating Co., St. Louis, Mo.
Berger Mfg. Co., Canton, O.
Burton, W. J. & Co., Detroit, Mich.
Canton Steel Roofing Co., Canton, O.
Cincinnati Corrugating Co., Piqua, O.
Eller, J. H. & Co., Canton, O.
Garry Iron & Steel Roofing Co., Cleveland, O.
Gummey, McFarland & Co., Phila., Pa.
Holton Iron Roofing Co. Lisbon, O.
Kanneberg Roofing Co., Canton, O.
New York Iron Roofing & Cor. Co., Jersey City, N. J.
Reeves Iron Co., Canal Dover, Ohio.

Roofing Nails.
Salem Nail Co., 279 Pearl St., N. Y.

Roofing Slate.
Bray, J. & Co., E. Bangor, Pa.
Galt, John & Sons, 253 Broadway, N. Y.
Johnson, E. J. & Co., 38 Park Row, N. Y.

Sap Spouts.
Millar, C. & Son Co., Utica, N. Y.

Schools and Colleges.
International Correspondence Schools, Scranton, Pa.
United Correspondence Schools, 154-158 5th Ave., N. Y.

Screens.
Harrington & King Perforating Co., Chicago, Ill.

Sheet Metal Machinery.
Bertsch & Co., Cambridge City, Ind.
Bliss, E. W. Co., Brooklyn, N. Y.
Clough, R. M., Tolland, Conn.
Double Truss Cornice Brake Co., Buffalo, N. Y.
Ferracute Machine Co., Bridgeton, N. J.
Keene, Geo. C. & Co., Cincinnati, O.

SEE ALPHABETICAL INDEX, PAGE 58.

Miner & Peck Mfg. Co., New Haven, Conn.
Niagara Machine & Tool Wks., Buffalo, N. Y.
Ohl, Geo. A. & Co., Newark, N. J.
Peck, Stow & Wilcox Co., 27 Murray St., New York.
Phila. Machine Tool Co., Phila., Pa.
Piqua Mfg Co., Piqua, O.
Robinson, J. M. & Co., Cincinnati, O.
Rudolphi & Krummel, Chicago, Ill.
Stiles & Parker Press Co., Brooklyn, N. Y.

Sheet Metal Ornaments.
Missouri Sheet Metal Ornament Co., St. Louis, Mo.

Sheet Zinc.
American Nickeloid Co., Peru, Ill.

Sheets, Iron and Steel.
Apollo Iron & Steel Co., Pittsburgh, P
Ætna-Standard Iron & Steel Co., Bridgeport, O.
Berger Mfg. Co., Canton, O.
Bruce & Cook, 186 to 190 Water St., N. Y.
Cincinnati Corrugating Co., Piqua, O.
Coshocton Rolling Mill Co., Coshocton, Ohio.
Follansbee Bros. Co., Pittsburgh, Pa.
Gummey, McFarland & Co., Phila., Pa.
Kirkpatrick & Co., Ltd., Pittsburgh, Pa.
McCullough Iron Co., Wilmington, Del.
Osborn, J. M. & L. A., Cleveland, O.
Struthers Iron & Steel Co., Struthers, Ohio.
Taylor, N. & G. Co., Philadelphia, Pa.
Wellsville Plate & Sheet Iron Co., Wellsville, O.
Wood, W. D. Co., McKeesport, Pa.
Wood Co., Alan Philadelphia, Pa.

Sheets, Galvanized.
Ætna-Standard Iron & Steel Co., Bridgeport, O.
Apollo Iron & Steel Co., Pittsburgh, Pa.
Bruce & Cook, 186 to 190 Water St., N. Y.
Cinn Corrugating Co., Piqua, Ohio.
McClure & Co., Pittsburgh, Pa.
McCullough Iron Co., Wilmington, Del.
Reeves Iron Co., Canal Dover Ohio.
Struthers Iron & Steel Co., Struthers, Ohio.
Taylor, N. & G. Co., Philadelphia, Pa.
Wood Alan Co., Philadelphia, Pa.

Shingles and Tiles, Metallic.
Burden, W. J. & Co., Detroit, Mich.
Cortright Metal Roofing Co., Philadelphia, Pa.
Meurer Bros. Co., Brooklyn, N. Y.
Thorn Shingle & Ornament Co., Philadelphia, Pa.

Shot.
Colwell Lead Co., 63 Centre St., N. Y.

Siding. *(See Roofing and Siding.)*

Skylights.
Canton Steel Roofing Co., Canton, O.
Rasner & Dinger, Pittsburgh, Pa.

Slaters' Tools.
Galt, Jno. & Sons, 253 Broadway, N. Y.
Salem Nail Co., 279 Pearl St., N. Y.

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Halliday, C. G., East 9th St., N. Y.

Soap and Sponge Racks.
Frank & De Keyser, 172 Fulton Street, N. Y.

Solder.
Bruce & Cook, 186 to 190 Water St., N. Y.
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McClure & Co., Pittsburgh, Pa.
Merchant & Co., Inc., Phila., Pa.
Meurer Bros. Co., Brooklyn, N. Y.
Sanborn, J., 217 Water St., N. Y.
Taylor, N. & G. Co., Philadelphia, Pa.

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Burgess Soldering Furnace Co., Columbus, Ohio.
Hull, M. L., Cleveland, O.
Indianapolis Steel Roofing & Cor. Co., Indianapolis, Ind.
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Dixon, Jos. Crucible Co., Jersey City, N. J.

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Newton, W. M., Albany, N. Y.
Presbrey Stove Lining Co., Taunton, Mass.
Rutland Fire Clay Co., Rutland, Vt.
Taylor, Chas. Sons Co., Cincinnati, O.
Valentine, M. D. & Bro. Co., Woodbridge, N. J.

Stove and Metal Polish.
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Rutland Fire Clay Co., Rutland, Vt.

Stove Ornaments.
American Pin Co., Waterbury, Conn.

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Gobeille Pattern Co., Cleveland, O.
Vedder Pattern Works, Troy, N. Y.

Stove Pipe.
Howes, S. M. Co., Boston, Mass.
Reeves Iron Co., Canal Dover, Ohio.

Stove Pipe Thimbles.
Cheney, S. & Son, Manlius, N. Y.

Stove Repairs.
Hessler, H. E., Syracuse, N. Y.
Howes, S. M. Co., Boston, Mass.
Marcy Stove Repair Co., 74 Beekman St. N. Y.
Magoon A. J. & Son, Providence, R. I.
Troy Nickel Works, Troy, N. Y.

Stove Trimmings, &c.
Fanner Mfg. Co., Cleveland, O.
Greene, W. F., Troy, N. Y.
Troy Nickel Works, Troy, N. Y.

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Howes, S. M. Co., Boston, Mass.
Mersick, C. S. & Co., New Haven, Conn.

Stoves and Ranges.
Barstow Stove Co., Providence, R. I.
Bergstrom Bros. & Co., Neenah, Wis.
Eclipse Stove Co., Mansfield, O.
Floyd Wells & Co., Royersford, Pa.
Giblin & Co., Utica, N. Y.
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Monarch Stove & Mfg. Co., Mansfield, Ohio.
Odin Stove Mfg. Co., Ltd., Erie, Pa.
Ringen Stove Co., St. Louis, Mo.
Standard Lighting Co., Cleveland, O.

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Monarch Stove & Mfg. Co., Mansfield, Ohio.
Novelty Mfg. Co., Jackson, Mich.
Ringen Stove Co., St. Louis, Mo.
Schneider & Trenkamp Co., Cleveland, Ohio.
Standard Lighting Co., Cleveland, O.

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American Tin Plate Co. Chicago, Ill.

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Bliss, E. W. Co., Brooklyn, N. Y.
Bruce & Cook, 186 to 190 Water St., New York.
Follansbee Bros. Co., Pittsburgh, Pa.
Keene, Geo. C. & Co., Cincinnati, O.
Niagara Machine & Tool Wks., Buffalo, N. Y.
Ohl, Geo. A. & Co., Newark, N. J.
Peck, Stow & Wilcox Co., 27 Murray St., New York.
Stiles & Parker Press Co., Brooklyn, N. Y.
Tinners' Machinery & Supply Co., 20 Cliff St., New York.

Tinners' Trimmings.
Vogel, Wm. & Bros. Brooklyn, N. Y

Tin Plate
Ætna-Standard Iron & Steel Co., Bridgeport, O.
American Tin Plate Co., Chicago, Ill.
Berger, L. D., Philadelphia, Pa.
Bruce & Cook, 186 to 190 Water St., New York.
Follansbee Bros. Co., Pittsburgh, Pa.
Gummey, McFarland & Co., Phila., Pa.
McClure & Co., Pittsburgh, Pa.
Merchant & Co., Inc., Phila., Pa.
Meurer Bros. Co., Brooklyn, N. Y.
Norristown Tin Plate Co., Norristown, Pa.
Osborn, J. M. & L. A., Cleveland, Ohio.
Taylor, N. & G. Co., Philadelphia, Pa.
Trench, Stewart & Co., 73 Beekman St., N. Y.

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Keen & Hagerty Mfg Co., Baltimore, Md.
Seavey Mfg. Co., Boston Mass.
Shepard, Sidney & Co. Buffalo, N. Y

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Globe Ventilator Co., Troy, N. Y.
Merchant & Co., Phila., Pa.
Meurer Bros. Co., Brooklyn, N. Y.
National Pancoast Ventilator Co., Phila., Pa.
Washburne, E. G. & Co., 46 Cortlandt St., New York.

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Marston, I. G. & Co., Boston, Mass.

Washtubs.
Keen & Hagerty Mfg. Co., Baltimore, Md.

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Boss Washing Machine Co., Cincinnati, Ohio.

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Colwell Lead Co., 63 Centre St., N. Y.
Zero Valve & Brass Mfg. Co., Buffalo N. Y.

Water Fronts.
Hessler, H. E., Syracuse, N. Y.

Water Heaters.
Adams, W. J., Joliet, Ill.
Kemp, C. M. Mfg. Co., Baltimore, Md.
Odin Stove Mfg. Co., Ltd., Erie, Pa.

Wind Gates.
Miner & Peck Mfg. Co., New Haven, Ct

Wire Working Machinery.
Rudolphi & Krummel, Chicago, Ill.

SEE ALPHABETICAL INDEX, PAGE 58.

THE METAL WORKER.

With which is Incorporated The Stove and Tin Trade Journal, The Sheet Metal Builder, and Metal.

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ALPHABETICAL LIST OF ADVERTISERS.

Acme Gas Stove Co..... 10
Adam, W. J..... 21
Adler, H. Co..... 10
Æolipyle Co..... 15
Ætna-Standard Iron & Steel Co..... 69
Ahrens & Ott Mfg. Co..... 23
American Corrugating Co... 74
American Pin Co..... 23
American Tin Plate Co..... 69
Apollo Iron & Steel Co. 1
Baldwin Refrigerator Co... 64
Barstow Stove Co..... 80
Berger Bros. Co..... 66
Berger, L. D..... 67
Berger Mfg. Co..... 72
Bergstrom Bros. & Co..... 15
Bertsch & Co..... 78
Bliss, E. W Co..... 78
Boss Washing Machine Co.. 61
Bray, J. & Co..... 73
Brooklyn Metal Ceiling Co... 72
Bruce & Cook.....68&80
Burgess Soldering Furnace Co..... 24
Burton, W. J. & Co..... 73
Canton Steel Roofing Co..... 75
Cheney, S. & Son..... 1
Cincinnati Corrugating Co.. 75
Clark, Geo. M. & Co..... 7
Clark Novelty Co..... 61
Clayton & Lambert Mfg. Co. 22
Cleveland Stamping & Tool Co..... 65
Clough, R. M..... 78
Colwell Lead Co..... 21
Condon, John..... 22
Cooney & Geiger..... 73
Cope, Geo. W..... 18
Cortright Metal Roofing Co.. 74
Cory, Usal & Co..... 15
Coshocton Rolling Mill Co.. 70
Crosby Steam Gage & Valve Co..... 1
Curtis & Curtis..... 23
Dangler Stove & Mfg. Co..... 4
Dighton Furnace Co.....1 & 11
Dixon, Jos. Crucible Co..... 17
Double Truss Cornice Brake Co..... 79
Drake, W. H..... 14
Eclipse Stove Co..... 10
Eller, J. H. & Co..... 75
Energy Mfg. Co..... 25
Fanner Mfg. Co..... 20
Fenn, Geo. E..... 67
Ferracute Machine Co..... 76
Floyd, Wells & Co..... 13
Follansbee Bros. Co..... 70
Fowler Automatic Draft Reg. & Vent. Co..... 15
Frand, Martin J. & Co..... 74
Frank & De Keyser..... 65
Friedley & Voshardt..... 73
Frink, I. P..... 80
Galt, John & Sons..... 73
Garry Iron & Steel Roofing Co..... 74
Globe Ventilator Co..... 67
Giblin & Co..... 12
Giessel, Henry & Co..... 22
Gobeille Pattern Co..... 18
Gordon, W. J..... 78
Gorton & Lidgerwood Co.... 1
Graff & Co..... 11
Grand Rapids Refrigerator Co..... 65
Greene, W. F..... 18
Gummey, McFarland & Co... 69
Gurney Heater Mfg. Co..... 13
Gurney Refrigerator Co..... 65
Halliday, C. G..... 73
Hanson & Van Winkle Co... 21
Harrington & King Perforating Co..... 58
Hart & Crouse Co..... 26
Heiland, Geo. W..... 22
Hessler, H. E..... 19
Highton, Wm. & Sons..... 16
Hill, Jas. Mfg. Co..... 20
Hill, Whitney & Wood Co.... 65
Hoffman, Geo. W..... 20
Holton Iron Roofing Co..... 74
Howard Thermostat Co..... 12
Howes, S. M.....19&20
Howson & Howson..... 61
Hull, M. L..... 24
Hungerford, U. T., Brass & Copper Co..... 65
Illinois Malleable Iron Co... 25
Incandescent Light & Stove Co..... 22
Independent Register Co.... 16
Indianapolis Steel Roofing & Cor. Co..... 21
International Correspondence Schools..... 60
International Heater Co..... 8
I. X. L. Beer Pump Co..... 22
Iwan Bros..... 67
Jackson's Sons, W..... 16
Janney, Steinmetz & Co..... 74
Jenkins Bros..... 1
Johnson, E. J. & Co..... 73
Kanneberg Roofing Co..... 74
Keen & Hagerty Mfg. Co..... 61
Keene, Geo. C. & Co..... 77
Kelsey Furnace Co..... 26
Kemp, C. M. Mfg. Co..... 25
Kieley, T..... 1
Kirkpatrick & Co., Ltd..... 72
Knapp, F. H..... 16
Koven, L. O. & Bro..... 21
Lalance & Grosjean Mfg. Co. 62
Lawler Water Feed & Damper Regulator Co..... 25
Lawrence-Letts Elbow Co... 18
Litchfield, J. M..... 65
Littleford Bros..... 70
McClure & Co..... 80
McCullough Iron Co..... 68
Magee Furnace Co..... 1
Magoon, A. J. & Son..... 19
Marcy Stove Repair Co..... 19
Marlin & Co..... 66
Marston, I. G. & Co..... 21
Maule, Francis I..... 60
Mechanical Engineering Construction Co..... 22
Merchant & Co Inc..... 17
Merkel, H..... 23
Mersick, C. S. & Co..... 25
Meurer Bros. Co..... 67
Michigan Barrel Co..... 64
Millar, Chas. & Son..... 80
Miner & Peck Mfg. Co..... 77
Missouri Sheet Metal Ornament Co..... 74
Monarch Stove & Mfg. Co.. 9
Morgan & Co..... 25
Mueller, L. J. F'ce Co..... 12
Munsell, E. & Co..... 17
National Pancoast Ventilator Co..... 66
National Pipe Bending Co... 14
Newton, Wm. M..... 1
New York Iron Roofing & Corrugating Co..... 74
Niagara Machine & Tool Wks 77
Norristown Tin Plate Co. 1&77
Novelty Mfg. Co..... 8
Odin Stove Mfg. Co., Ltd.... 14
Ohl, Geo. A. & Co..... 78
Osborn, J. M. & L. A..... 72
Ostrander, W. R. & Co..... 73
Palermo Mica Co..... 17
Peck, Stow & Wilcox Co 76
Phil. Hdw. & Mall. Iron Wks 16
Phila. Machine Tool Co..... 76
Poorman Mfg. Co..... 79
Presbrey Stove Lining Co... 18
Rasner & Dinger..... 73
Reeves Iron Co..... 70
Remmers Pattern Co..... 20
Ringen Stove Co..... 2
Robinson, J. M. & Co..... 79
Ross Radiator Co..... 16
Rudolphi & Krummel..... 75
Rutherford, J. & Son..... 14
Rutland Fire Clay Co..... 18
Salem Nail Co..... 72
Sanborn, John..... 74
Saunders', D. Sons..... 23
Schneider & Trenkamp Co... 5
Schratwiesers Metal Lath Works..... 73
Schwab & Sercomb 16
Schwerdtle & Siebert..... 61
Seavey Mfg. Co.. .....16&64
Shepard, Sidney & Co..... 63
Sheppard, Isaac A. & Co..... 1
Silver & Co..... 24
Smith & Thayer Co. 11
Souther, E. E. Iron Co..... 73
Special Notices..... 60
Sperry, D. R. & Co..... 61
Stamford Foundry Co..... 14
Standard Lighting Co..... 6
State Line Talc Co..... 22
Stebbins, E. Mfg. Co..... 25
Stiles & Parker Press Co..... 76
Stocking, E. B..... 61
Stover Mfg. Co..... 20
Struthers Iron & Steel Co... 1
Superior Foundry Co..... 14
Taylor's, Chas. Sons Co..... 16
Taylor Co., N. & G..... 80
Tinners' Mchry & Supply Co. 77
Thorn Shingle & Ornament Co..... 70
Trench, Stewart & Co..... 78
Toledo Mch. & Tool Co..... 75
Troy Nickel Works..... 19
Tubular Heating & Ventilating Co..... 18
Tucker Mfg. Co..... 75
Tufts, Walter B..... 25
Turner, W. W. & Co..... 24
United Correspondence School..... 60
Valentine, M. D. & Bro. Co... 18
Vanderman Plumbing & Heating Co..... 22
Vedder Pattern Works..... 20
Vogel, William & Bros..... 66
Walworth Run Foundry Co. 16
Washburne, E. G. & Co...66&74
Weir Stove Co..... 80
Wellsville Plate & Sheet Iron Co..... 63
Weyand, Henry..... 67
Wheeler, E. S. & Co..... 1
Wheeler, W. A..... 73
Wister, L. & R. & Co..... 80
Wood, Alan Co..... 68
Wood Co., W. Dewees..... 80
Young, Jos. H..... 22
Zero Valve Co..... 24
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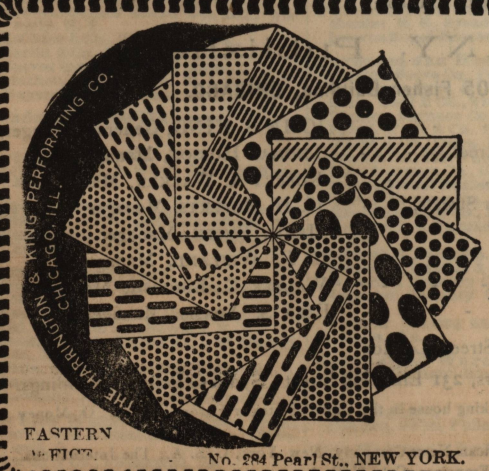

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Original letters of reference should not be inclosed with replies to advertisements appearing in these columns, as they are frequently mislaid and lost. A copy of the reference will serve the purpose.

HELP WANTED.

SALESMEN to visit users of emery wheels; state age, experience and salary expected. "Emery," care *The Metal Worker*, New York. Jan. 13

A good TINNER; one with experience in cornice and skylight work. J. H. Brice, Washington, Pa. Jan. 13

A first-class TINNER for inside and outside work; steady employment the year round; must be temperate. A. R. Kanney, Greenspring, Ohio. Jan. 13

To correspond with salesman or manufacturers' agent selling hardware or heating trade. "Sell," care *The Metal Worker*, New York. Jan. 13

A good practical tinner for roofing, guttering, furnace, tank and cornice, and all kinds of job work; and if you are a first-class plumber all the better; if you use tobacco to excess, or liquor or are a time killer, do not answer this; a good steady job at reasonable wages for the right man; state ability and wages expected. Winfield's Hardware & Implement Company, Blackwell, O. T. Jan. 13

A man, who can sell a popular priced line of gas stoves and hot plates, and will go into the business to push it, can secure a good thing by addressing "Popular," care *The Metal Worker*, New York. Jan. 13

ROOFING SLATE SALESMAN; one having experience. Apply to E. J. Johnson & Co., 38 Park row, New York. Jan. 13

First-class TINSMITH on sugar tools, who will work for small wages for the winter; must have first-class references; employer will furnish board and room; state wages expected. Apply at once P. O. Box 435, Barre, Vt. Jan. 13

TRAVELING SALESMAN; only first-class man need apply; give age, experience and references. Address Garry Iron & Steel Roofing Company, Cleveland, Ohio. Jan. 13

A first-class TINSMITH; young man with some knowledge of plumbing preferred; one accustomed to general jobbing in a country shop; to right party, steady work assured; state age, reference and salary wanted. "K.," care *The Metal Worker*, Mason Building, Boston, Mass. Jan. 13

ASSISTANT SUPERINTENDENT in a tin and sheet iron manufacturing plant in a Western city; must have experience; a good chance for a person of ability to advance. "Assistant Superintendent," care *The Metal Worker*, 1205 Chemical Building, St. Louis, Mo. Jan. 6

A good TIN and GENERAL SHEET METAL WORKER; one who can put up plain cornice and do furnace work; steady job to a sober, married man, who can show that he is an up to date workman. Apply to 68 West Main street, Lexington, Ky. Jan. 6

A first-class all around TINSMITH and PLUMBER; must be temperate and reliable; state experience and wages. "G.," Box 128, Manchester, Vt. Jan. 6

A TRAVELING SALESMAN for the New England States, who is acquainted with the tinners, hardware dealers, principal contractors, &c., in this district; young man preferred. "Bosmetal," care *The Metal Worker*, 70 Kilby street, Boston, Mass. Jan. 6

First-class SALESMEN to handle a line of air tight stoves, stove pipe, &c., as side line on commission; salesmen selling for regular stove foundries having an established trade preferred; state line you are handling and give territory. "Line," care *The Metal Worker*, New York. Jan. 6

A first-class experienced SALESMAN among the department store trade of Greater New York and the Eastern country by a manufacturer of oil stoves and ovens who is bringing out something new and adaptable to this trade; must be thoroughly conversant with this department store trade and have had experience. "Experienced," care *The Metal Worker*, New York. Jan. 6

A SALESMAN thoroughly familiar with Southern trade to sell a very marketable line of steel ranges. "Southern Trade," care *The Metal Worker*, New York. Jan. 6

SITUATIONS WANTED.

I want to make connection with a manufacturer making a specialty of pressure tanks for air, gas or oil; I can control profitable trade in this line; can give exceptional references. "A. B. C., 13," care *The Metal Worker*, New York. Jan. 13

Steady position as PLUMBER in country town or small city; can do first-class work in all branches of plumbing; fast workman; wages moderate; sober; references; New England States or Long Island preferred. "C. E.," care *The Metal Worker*, New York. Jan. 13

By February 15 or March 1 by a young man, 24, as TINNER; seven years' experience in all lines of inside and outside work, hot air furnace work, &c.; has had considerable experience on steam and hot water heating; single; references. "M. T.," Box 157, Raritan, N. J. Jan. 13

By TINSMITH and SHEET IRON WORKER; German; good at inside and outside work; some knowledge of plumbing. Chas. Walleem, 108 East Eighth street, New York. Jan. 13

Experienced TRAVELING SALESMAN would like to represent manufacturer direct in New York State on the following and kindred lines for 1900 on commission: Pieced and stamped tinware, granite ware, coal hods, elbows. Address "Specialty Salesman," 192 Hoyt street, Buffalo, N. Y. Jan. 13

By an experienced master plumber who understands steam, hot water heating, also sheet iron and cornice work; open for engagement as SUPERINTENDENT or FOREMAN. "J. J. S.," care *The Metal Worker*, New York. Jan. 13

By a young man, 24, who has had two years' experience at plumbing and one year at the New York Trade School. Joseph Magengast, care Mr. Fromer, 97 Russel street, Brooklyn, N. Y. Jan. 13

By an experienced STOVE PLATE MOLDER in a foundry running over 11 months a year; best of references. "J. C.," room 217, Palace Hotel, 101 North Clark street, Chicago, Ill. Jan. 13

As assistant in a tin shop by a young man, 19; three years' experience and good at tin roofing, spouting, &c.; or as clerk in hardware store; best of references. C. Marchetti, Jr., P. O. Box 11, Sheppton, Pa. Jan. 13

As hardware clerk and all round man; ten years' experience; sober and reliable. "H.," care *The Metal Worker*, 33 Mason Building, Boston, Mass. Jan. 13

By a young man, 21, as TRAVELING SALESMAN for North and South Carolina and Georgia for hardware, house furnishing goods and hardware specialties; six years' experience in store; best of reference; salary no object. "R. L. L., Jr.," Box 262, Raleigh, N. C. Jan. 13

By a CORNICE MAKER; first-class workman. J. Green, 95 Meserole street, Brooklyn, N. Y. Jan. 13

By a young married man who would like to finish his trade at steam fitting; one and a half years' experience with E. & H. Gas Company on stove, meter and all kinds of street connections. "W. H. B.," Library Hall, Bloomfield, N. J. Jan. 13

As TRAVELING SALESMAN for regular line or specialties in hardware or kitchen furnishing goods; ten years' experience and first-class references. "B. E. F.," care *The Metal Worker*, New York. Jan. 13

By a first-class PLUMBER who can do sanitary plumbing, lead and iron pipe gas fitting, bar work, and have had some experience with steam and water heating; 12 years' experience; can work from plans and specifications; desire steady position with some reliable firm. "Lead Worker," care *The Metal Worker*, New York. Jan. 13

By a TINSMITH, 30 years of age; tin roofing, slating, furnace work and general jobbing. John Bay, 13 Englewood avenue, Englewood, N. J. Jan. 13

ELECTROPLATER, after January 15, wants situation; am first-class on all kinds of work; write me and will explain; take full charge. "S. C.," care *The Metal Worker*, New York. Jan. 13

By an intelligent young man of good character, having had eight years' experience in retail hardware, stove and house furnishing store, desires to represent some good concern or line of goods in his home, Los Angeles, Cal., or adjoining States; can furnish best of references from former employer. A. Y. Soulé, 119 Garnett street, Atlanta, Ga. Jan. 13

STOVE PATTERN FITTER; have been carefully trained in all work pertaining to iron patterns; 14 years' experience on best class of work made; have had charge of shop; can manage men to advantage; temperate, industrious and willing; high credentials. "J. W. R.," care *The Metal Worker*, New York. Jan. 13

By a practical nickel plater in all its branches, polisher and buffer; 20 years' experience; capable of running nickel plating plant; with last firm 15 years; best references. "Tyler," care *The Metal Worker*, 1205 Chemical Building, St. Louis, Mo. Jan. 13

By a first-class CORNICE and SKYLIGHT MAKER, also good as cutter; inside and outside work. M. Grossman, 745 East Sixth street, New York. Jan. 13

A good sober and steady man, who wants to make a change; STOVE PATTERN FILER and FITTER; looking for steady work. Richard Meissner, 110 North Franklin street, Evansville, Ind. Jan. 13

A side line to sell with stoves in Minnesota and South Dakota. "Side Line," care *The Metal Worker*, Fisher Building, Chicago, Ill. Jan. 13

A man with ten years' experience in the kitchen and house furnishing and tinware line, with large personal acquaintance with the New England trade, especially with the large department stores, stove and tinware dealers, and thoroughly knows his business, would like to make an engagement with a good manufacturing company to represent them in New England States, either salary or commission basis; can furnish reference from A1 Chicago, New York and Boston houses. "Traveler," 92 North street, Boston, Mass. Jan. 13

Experienced local and traveling SALESMAN, aged 40, for seven years sales agent of corporation in this city dealing with stove manufacturers, hardware, tin and plumbing goods jobbers, well acquainted with best buyers, is open for immediate engagement with live manufacturer as New York representative at moderate salary or on commission basis with exclusive sale; high credentials. "Practical, 14," care *The Metal Worker*, New York. Jan. 6

By a first-class TINSMITH, STOVE and FURNACE WORKER a steady situation where a good sober mechanic would be appreciated. G. W. Bange, G. D. P. O., Washington, D. C. Jan. 6

By a FOREMAN and CUTTER; a practical mechanic experienced in handling large jobs and men to advantage; can estimate from plans. "James," care *The Metal Worker*, New York. Jan. 6

Having long experience as a local salesman and practical workman, I wish to enengage with some hot air furnace manufacturer to sell their goods on the road or act as LOCAL SALESMAN; am competent to give estimates and make up stock and set the furnaces if necessary. O. W. Kenyon, Kirk Block, Syracuse, N. Y. Jan. 6

By a SALESMAN of 20 years' experience in Iowa, Illinois, Missouri, Kansas, &c., an engagement for 1900 with a first-class stove, range and furnace manufacturer or tin plate and metal house. "L. G.," care *The Metal Worker*, New York. Jan. 6

By a good all around TINNER and GENERAL JOBBER; experienced at roofing, spouting, guttering, pump and pipe work; Illinois or Iowa preferred. Box 281, Celina, Ohio. Jan. 6

By an all around TINNER and SHEET IRON WORKER; 15 years' experience at all branches; able and willing to work. Wm. Mullen, Saratoga Springs, N. Y. Jan. 6

By a TINSMITH, BRASS and COPPER WORKER. S. Golomd, 3 Goerck street, New York. Jan. 6

An expert in hot water, steam and hot air heating wishes steady situation; strictly temperate; can estimate; best of reference. "Heating," care *The Metal Worker*, New York. Jan. 6

A STOVE PATTERN MAKER, with 20 years' experience and competent to do designing and carving of the latest style of stove ornamentation, wants a permanent position in a stove foundry at reasonable wages. C. Carver, 426 John street, Lansingburg, N. Y. Jan. 6

In a tin shop by young man, 20 years of age, five years' experience at copper, tin and sheet iron work, also cornice, roofing and blower piping; Louisiana or Mississippi preferred. D. McConnon, 429 Thalia street, New Orleans, La. Jan. 6

By a PLUMBER, GAS FITTER and TINSMITH; seven years' experience in country shops. Box 245, Bay Shore, L. I., N. Y. Jan. 6

Special Notices.

Wanted.

Foundry Near New York.

Wanted, to rent, lease or purchase Foundry with capacity of 15 to 20 tons, with cupola, blowers, engines, etc. Must be within reasonable distance of New York, with water and rail facilities. Buildings and equipment must be in good order. Principals only address

"BUTS,"
Care *The Metal Worker*,
New York.

Patents For Sale.

The owner wishes to sell the following patents, or place them on royalty to manufacturers.

Pipe Connection, No. 471,247, patented Mar. 22d, 1892.
Pipe Joint Repairer. No. 580,996, patented Apr. 20th, 1897.
Combination Die Stock and Reamer, No. 467 067, patented Jan. 12, 1892.
Faucet, No. 430,712, patented June 24th, 1890.
Bathing Appliance No. 634,486, patented Oct. 10th, 1899.
Pipe Wrench, No. 633,709, patented Sept. 26th, 1899.
Shower Bath Apparatus, 603,299, patented May 3d, 1898.
Stand for Toilet Articles, No. 626,739, patented June 13th, 1899.

This is a good opportunity for a manufacturer to add to his line of specialties, or for a party to get hold of some good patents. Address

"PATENTS FOR SALE,"
care *The Metal Worker*, New York.

WANTED,

to manufacture for the Canadian trade, as a side line, some specialty in the sheet metal line, large factory, good tools and good shipping facilities.

P. O. BOX 233,
Niagara Falls, Ontario.

FOR SALE.

Plumbing, Heating and Tinshop in one of the best plumbing towns in New York State. At present working seven men. Will sell at inventory price. Reason for selling on account of sickness. Address

"F. 113,"
care *The Metal Worker*, New York.

FOR SALE.

The best Cornice, Skylight and General Jobbing shop in a city of 35,000. Stock and tools will invoice $1200. Good credit Established with good surrounding territory for work Splendid opportunity for a couple thorough mechanics who can work hand in hand. None but intending purchasers need apply. Address

"OPPORTUNITY, 113,"
care *The Metal Worker*, New York.

For Sale.

Tinshop and Stove Store. Good paying business. Invoice $2,000. No competition. Population 1500. Other business on hand. "P. 16,"
care *The Metal Worker*, New York.

Special Notices.

AUCTION NOTICE.

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Lalance & Grosjean Mfg. Co 's

Enameled Ware and Stamped Tinned Ware, Seconds.

E. BISSELL & CO.,

Wholesale Auctioneers.

Thursday and Friday, Jan. 18th and 19th, 1900

At 10 O'Clock Each Day,

At No. 12 Murray St and 15 Park Place, N.Y.,

BY ORDER OF THE

Lalance & Grosjean Mfg. Co.,

On sixty days' time for approved notes.

THURSDAY, JAN. 18TH, AT 10 O'CLOCK.

SEVERAL THOUSAND CASES

Blue and White, Pearl Agate, White and White and Peerless Enameled Ware, seconds, comprising a large assortment of goods that are good sellers, and which you can buy at your own prices, and sell as ***Leaders*** The above goods will be sold in ***case lots,*** and the sale will be worthy the attention of all buyers of Enameled Ware.

FRIDAY, JAN. 19TH, AT 10 O'CLOCK,

BY ORDER OF THE

Lalance & Grosjean Mfg. Co,

LARGE UNRESERVED SALE OF

50,000 PIECES

of Pearl Agate, White and White and Gray Enameled Ware and Stamped Tinned Ware, etc., etc., to be sold in open and case lots, and comprising a very ***large assortment of desirable goods, suitable for the Retail Trade.***

WANTED.

To buy a set of Iron Pattern Castings for full line of Steel Ranges, Square Oven Coal and Wood Cooks, up-to-date and Cast Top and Bottom Wood Air-Tights. Address

DETROIT GALVANIZING AND SHEET METAL WORKS,
Detroit, Mich.

FOR SALE.

A complete set of Tinners' Tools and Machines, cheap. Good condition. Must be sold at once. Address

R. U. MILLER, Assignee,
Crestline, Ohio.

FOR SALE.

Two Drop Brakes in good condition, both 8 foot sizes and one arranged for power. Cheap for cash.

Address "K. L. I. M.,"
care *The Metal Worker*, New York

Special Notices.

CASTINGS.

Having just added to our plant an excellently equipped foundry and having larger capacity than we ourselves will use, we solicit work in this department. We have special facilities for producing most excellent **LIGHT GRAY IRON CASTINGS** promptly and in any quantity.

Address DETROIT GALVANIZING AND SHEET METAL WORKS,
Detroit, Mich.

FOR SALE.

Hardware Specialty.

Several complete sets of Fence Ratchet Patterns, also a good established trade on same. Millions used every season A good bargain for any manufacturer of hardware specialties.

Address KRAMER BROS., Dayton, O.

The Lackawanna Hardware Co, of Scranton, Pa., have decided to retire from business, which is well established and doing a nice trade **A good opportunity is offered to any one desiring to locate in the very enterprising, growing and prosperous city of Scranton.** For particulars address as above.

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Two geared Ferracute presses, 62 in. between uprights; little used and in good condition. Address

W. H. MULLINS,
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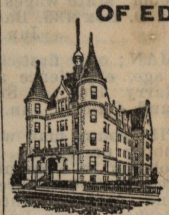

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The United Correspondence Schools.
154-56-58 Fifth Ave., New York, for catalogue No. 113.

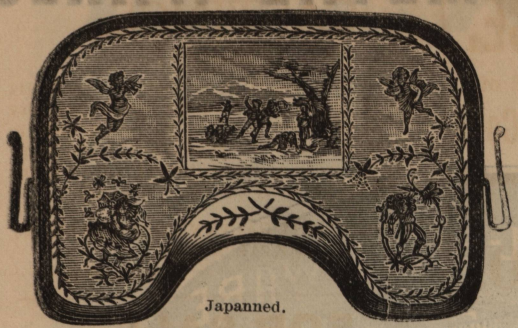
Perhaps

some of the regular patrons of this paper may have noticed radical changes in the advertisements of **MEURER BROS. CO., of Brooklyn, N. Y.,** commencing with the issue of Dec. 9th, 1899? If any of these "**noticers**" feel that it might possibly pay them also to desert the over-crowded ranks of the "noble army" of mere "Space Fillers," and to do some **actual advertising,** I shall be pleased to have such write me. It will afford me pleasure to suggest plans and quote prices to *anyone who believes his business has anything to gain from being presented to the public precisely as he would present it to a **single prospective customer** sitting beside his desk in his private office.

FRANCIS I. MAULE, Commercial Literature, 402 Sansom St., Philadelphia.

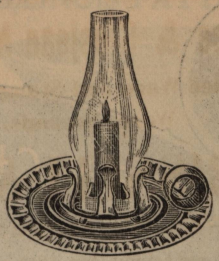
*N. B.—The above *does not apply* to anyone engaged in a business competing with Meurer Bros. Co., as from such I could not accept any business whatever.

"PRINCESS" CHILD'S TRAY.



Japanned.

The only Child's Tray that fully protects. Fitted closely around body of child with high projection in front. It gives perfect protection to the child and prevents soiling of table cloth or carpet.

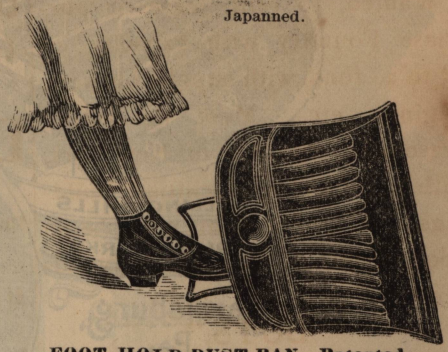


"Eavenson" Save-All Candlesticks

The peculiar construction allows for entire consumption of candle. Can be used with or without chimney. If used with chimney will give better light, as the flame will not flicker or blow out; the candle will last longer, and the chimney also prevents dripping of grease on floor, carpets, etc

himney can be procured from any dealer in lamp goods.

Japanned.



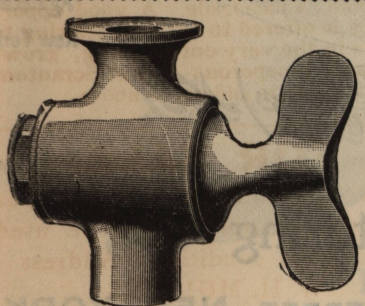
FOOT-HOLD DUST PAN. Patented.

To use the Foot-hold Dust Pan, place the left foot on the foot-hold. Stepping naturally on it causes the front or edge of pan to press closely to the floor. To move it from place to place, at the same time taking up the dirt, place the broom on the front of pan, lift with the toe; the broom steadies the pan and prevents the dirt from falling out.

Here are just a few specimens of our full line of Pieced, Heavy Polished, Stamped and Japanned Tinwares, Galvanized Ware, etc. Write us for catalogue and prices. We make all descriptions of Pieced, Heavy Polished, Stamped, Japanned and Gray Flint Enameled Ware.

KEEN & HAGERTY MFG. CO.,

Main Office and Salesroom, 16 West Baltimore St., Baltimore, Md. New York Salesroom, 51 Cliff St. Chicago Salesroom, 1115 Chamber of Commerce. Philadelphia Salesroom, 116 Market St.



The "OMEGA," 2-3 Size. To attach to bottom of can.

BEER,
MILK CAN,
OIL CAN,
CREAM SEPARATOR

FAUCETS.

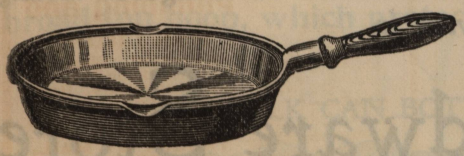
Various Sizes and Styles.

MANUFACTURED BY

CLARK NOVELTY CO., Rochester, N. Y.

Also Mfrs. of THE CLARK KEROSENE OIL SYSTEM for HEATING SOLDERING COPPERS.

SPERRY'S HOLLOW-WARE....



Is original in shape and finish. A little better and unlike the rest. Spiders and Griddles particularly nice. Not so high-priced either.

Not sold by Jobbers.
Write us.

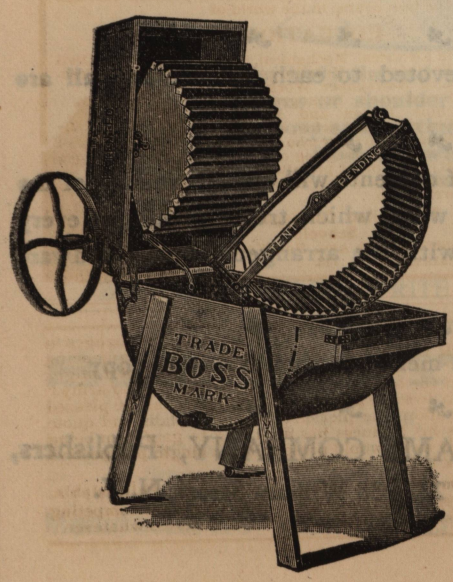
D. R. SPERRY & CO.,
HOLLOW-WARE FOUNDERS,
BATAVIA, ILL.

TRADE-MARK

"BOSS"

WASHING MACHINE

With Steel Frame Cylinder,



Allowing 2½ inch more space for clothes, giving a better circulation of water through the clothes, thereby cleansing them more thoroughly than by any other washer.

Order sample and see for yourself the superior advantages embodied in

THE "BOSS"

over any other. By handling the improved "BOSS" WASHER you will have the only genuine and best ever made.

For complete description and prices send for Circular "A."

Address the manufacturers.

BOSS WASHING MCH'E CO.,
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CINCINNATI, OHIO.

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It is a model of completeness and arrangement.

By far the most elaborate work of the kind published, and *indispensable to progressive pattern cutters.*

All branches of Sheet Metal Work.

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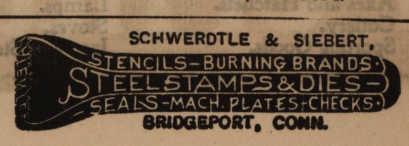
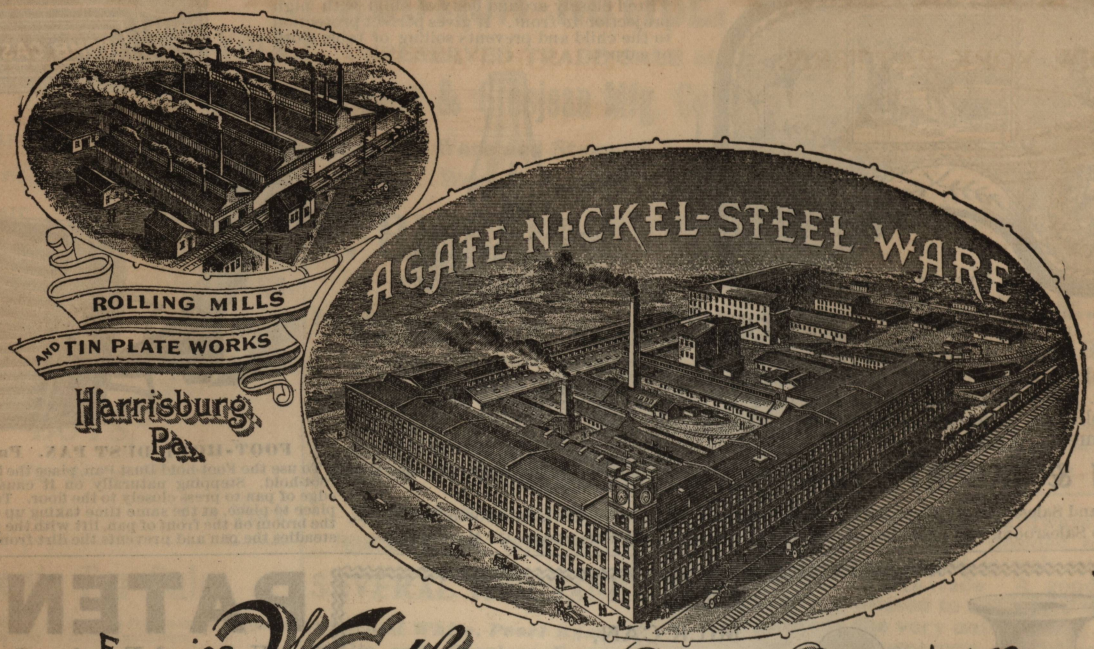


ENAMELED AND SHEET METAL WARES



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L & G Mfg. Co. TRADE MARK.

Lalance & Grosjean Manufacturing Co.,

19 & 21 CLIFF STREET, NEW YORK.

EVERY HARDWARE MERCHANT

will find valuable suggestions for the advantageous arrangement and display of hardware in

The American Hardware Store,

By R. R. WILLIAMS, Hardware Editor of *The Iron Age*. 450 Pages. 500 Illustrations. Price, $3.00.

SUMMARY OF CONTENTS.

General Arrangement.	Locks and Door Trimmings.
Office.	Sandpaper.
Shelving.	Screen Wire Cloth.
Galleries.	Wire.
Elevators and Cranes.	Files.
Show Windows.	Horseshoes.
Counters.	Chains.
Counter Showcases.	Belting.
Upright Showcases.	Rope.
Ceiling Arrangement.	Handles.
Sampling Goods.	Sleds.
Signs in the Store.	Scale Beams.
Pillars for Displaying Goods.	Farm Bells.
Scales.	Malleable Fittings, etc.
Roll Paper.	Pumps.
Nails.	Pipe and Tubing.
Farm and Garden Tools.	Axles.
Scythes.	Glass Racks.
Bolts, Screws, etc.	Glass Cutting Tables.
Crosscut Saws.	Paints and Colors.
Hand Saws.	Oils, Turpentine and Varnish.
Edge Tools.	Brushes.
Planes.	Oilcloth.
Squares.	Seeds.
Plumbs and Levels.	Bird Cages.
Axes and Hatchets.	Lamps.
Cutlery.	Stoves.
Sporting Goods.	Iron and Steel.

THIS volume has been compiled from the extended series of articles in *The Iron Age*, on the arrangement of Hardware Stores, and contains a large and varied mass of information in regard to store arrangement.

A chapter is devoted to each subject and all are fully illustrated.

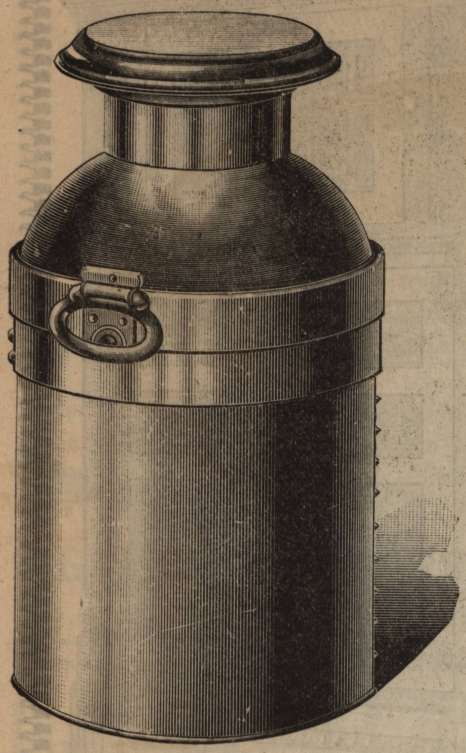
The summary of contents will convey an idea of the wide scope of the work, which treats of almost every subject connected with the arrangement of Hardware Stores.

Every hardware merchant should have a copy.

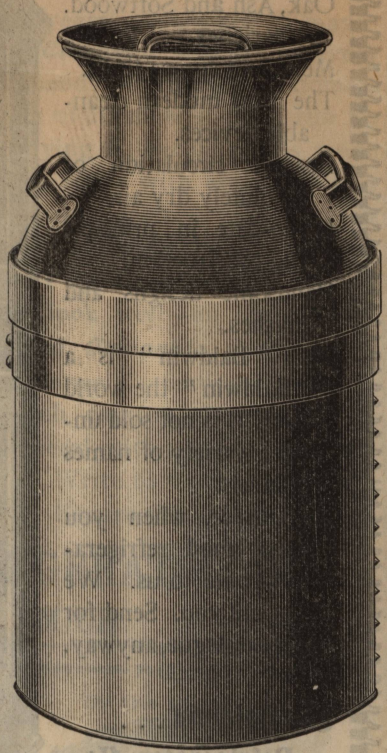
DAVID WILLIAMS COMPANY, Publishers,
232-238 William Street, N. Y.

MILK CANS.

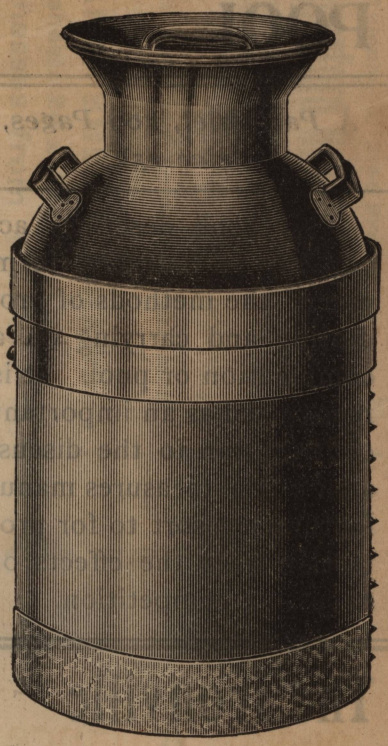
NEW YORK PATTERN.



ILLINOIS PATTERN.



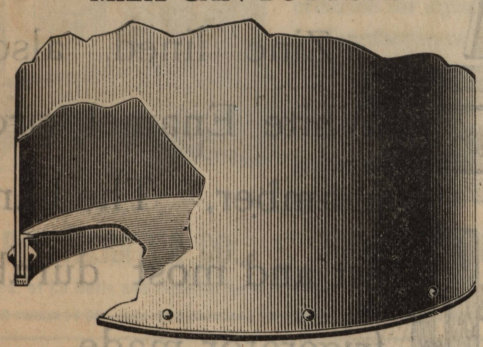
IOWA PATTERN.



THREE OF OUR PATTERNS.

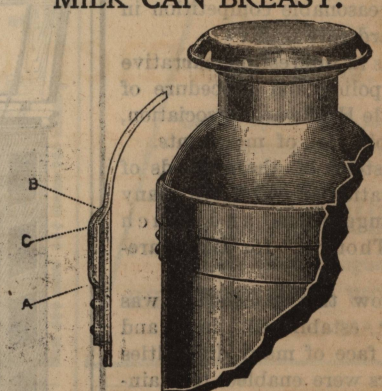
We also make the BUFFALO and BALTIMORE pattern cans. Our new patented Milk Can Breast and Bottom, used in the patterns illustrated, make our cans superior in strength and durability to all others. The stock is easily made up and is first quality from bottom hoop to cover handle. An excellent feature is the broad top hoop, which protects the body tin from being damaged by other cans.

MILK CAN BOTTOM.



Edges of body tin and can bottom rest on flanges or shoulder of the bottom hoop and are thus protected from all wear and strain.

MILK CAN BREAST.



Breast firmly gripped between shoulder (A) and top of hoop turned inward (B). Cannot be displaced up or down. Also supported by hoop (C). Breast and hoop retinned together.

BEFORE ORDERING WRITE OUR NEAREST HOUSE FOR COMPLETE CATALOGUE AND PRICES.

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145-149	21	19-25	800	1219-1221	1231-1233	1313-1315
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This book deals with the prevailing evils of unreasonable competition in the retail hardware trade.

It presents in interesting narrative form the policy and procedure of The Ironville Hardware Association, a local combination of merchants.

In the history of the methods of this organization are set forth many excellent suggestions and much "Food for Thought" for Hardwaremen.

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How a uniform and profitable standard of prices was instituted, and finally, how the local trade was re-established on a sound business basis to the permanent benefit of all concerned.

It is a common sense business book and will be useful and suggestive to hardware dealers as illustrating prevailing conditions in the trade.

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The Baldwin Refrigerators.

Strictly high grade.
Oak, Ash and Softwood.
125 varieties.
Metal and spruce lined.
The most modern cleanable devices.
Positive circulation of absolutely dry air.
Up-to-date in principle and construction.
Handsome designs and finishes.
The "Baldwin" is a "Baldwin" the world over. It is not sold under a variety of names or labels.
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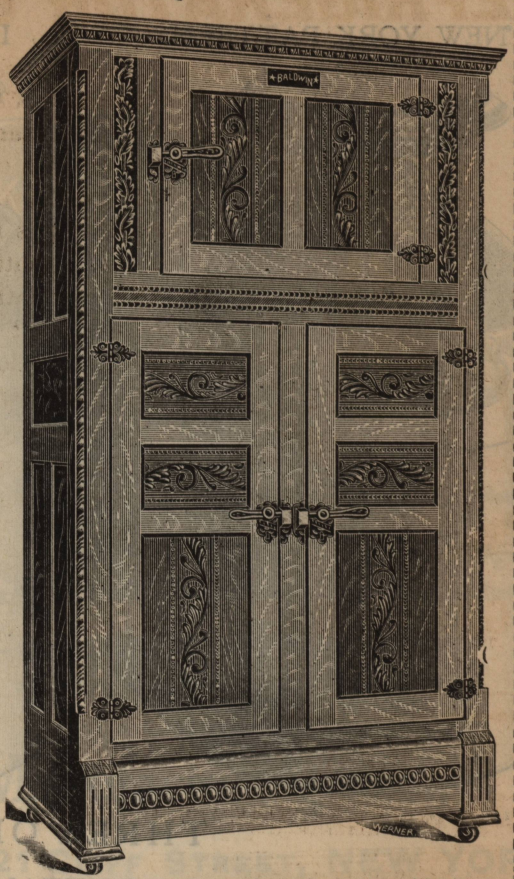

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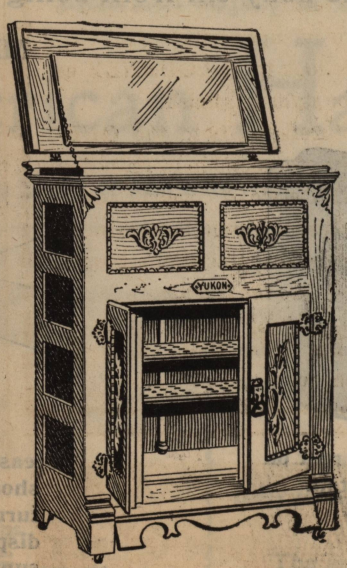

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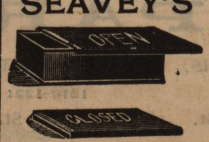

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Can be carried in the breast pocket when folded.

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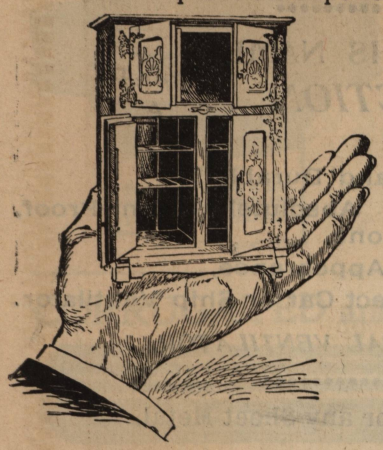

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THE GURNEY CAN BE KEPT ABSOLUTELY PURE AND CLEAN

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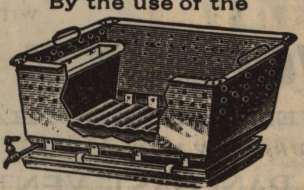

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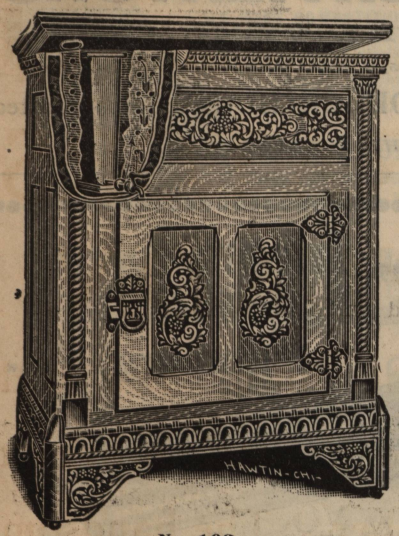

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All users testify to the GURNEY'S many points of superiority.

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Buy the Gurney Patent Refrigerator. It costs no more than imitations claimed to be "*made like the Gurney.*"

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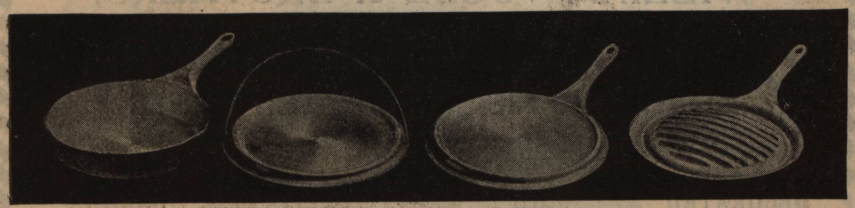

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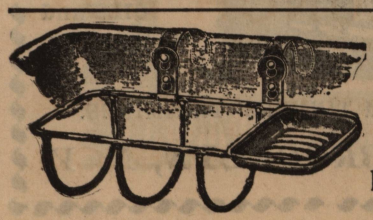

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No Seams.
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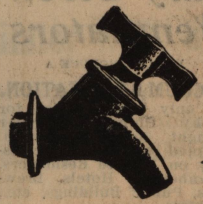

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Sizes 3/8 and ½ in., adapted for filters, etc.

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—BOASTING of her industrious habits, an Irish housemaid said she rose at five, put on the kettle, prepared the breakfast and made up all the beds before any one else was up in the house. —*Tid-Bits.*

—"AND camp life was not a bit like home, was it, hubby, dear?"

"H'm; well, the cooking was about the same, but we didn't see any actual warfare, you know."—*Indianapolis Journal.*

Perfection Ventilator.

The PERFECTION is built on Scientific Principles, being the most up-to-date Ventilator yet constructed, and also the simplest.

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Thoroughly Efficient,
Strong, Rigid and Durable,
Absolutely Storm-Proof,
Free from all Obstructions,
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A Perfect Car or Ship Ventilator.

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Special Sizes Made to Order of Galvanized Iron, Copper, Brass or any Sheet Metal.

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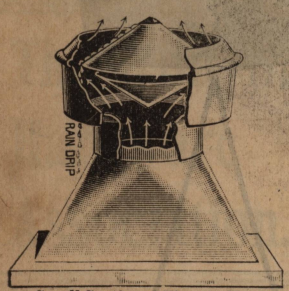

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A VENTILATOR THAT WILL VENTILATE.

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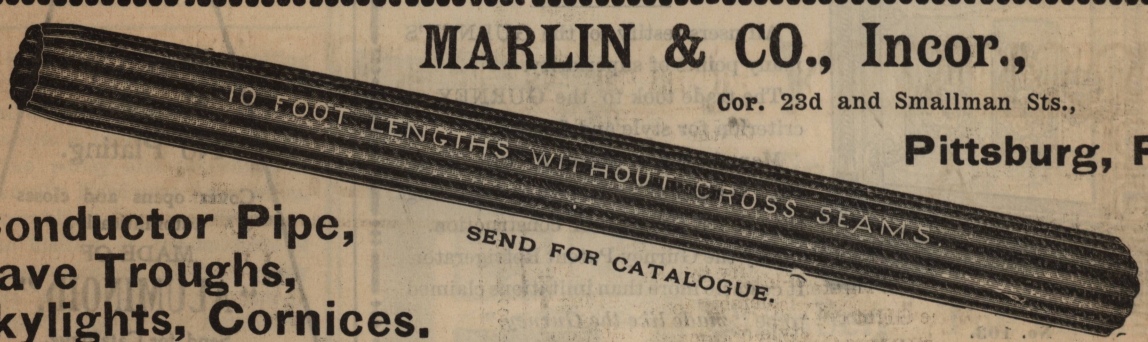

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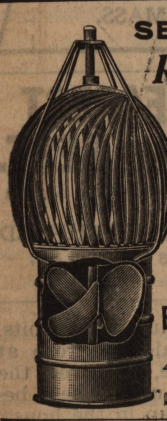
**Conductor Pipe,
Eave Troughs,
Skylights, Cornices.**



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The only positive cure for Smoky Chimneys, Poor Draught and Ventilation. Adopted and used successfully on Private Residences, Greenhouses, Hotels, Breweries, Public Buildings, etc., etc.

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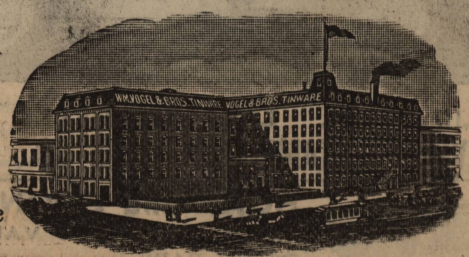
STAMPING AND PRESS WORK IN EVERY VARIETY.

PLAIN and DECORATED SEAMLESS BOXES for OINTMENTS, BLACKING, &c



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OILERS, SHEET-METAL SCREWS and TINNERS' TRIMMINGS.

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Brass, Copper, Galvanized Iron, and with Plate Glass Tops for Skylight Purposes.

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Smoky Chimneys Cured. Send for Model and Pamphlet.

Also "GLOBE VENTILATED RIDGING."

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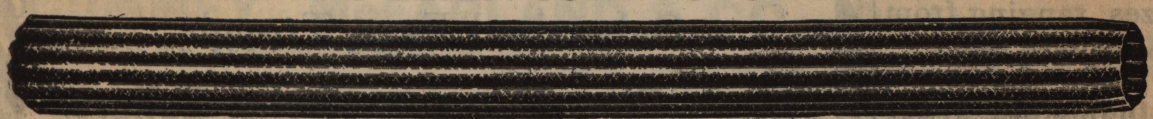
CORRUGATED and PLAIN CONDUCTOR PIPE and EAVE TROUGH,



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For simplicity, durability and practicability

WE DEFY COMPETITION.

It is unexcelled, inducing a regular draft at all times Send for prices and sample before purchasing some inferior article. For sale by all jobbers.

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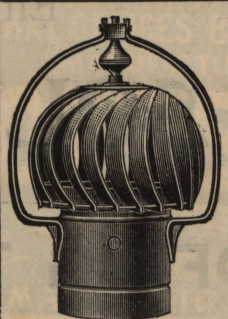

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For ventilation, the best.

For smoky chimneys, a sure cure.

Made in two grades, 4 in. to 30 in.

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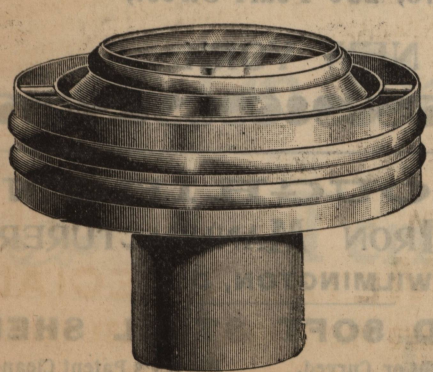

is, as every seaman knows, the one depended upon in cases of dire emergency. Here is a "Sheet Anchor" that makes a building fast to a never-failing supply of pure air. We recently spoke of the "Anchor" Ventilator as the "lungs" of a building, but here is a combination of "lungs" and "eyes," viz.:

The Anchor Ventilator with Glass Top.

This ventilator is absolutely simple in its make-up, is strong, durable, of moderate cost—and, moreover, it actually does VENTILATE.

Glad to have you write us for further "Anchor" details, prices, etc.

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To hang up in the shop for handy reference.

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The Best in the Market.

FOR SALE
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GENUINE AMERICAN CHARCOAL COMMON **IRON** RUSSIA PLANISHED CLEANED CLEANED

B. B. Galvanized Sheets,
Cold Rolled Soft Steel,
Sheet Zinc, Sheet Copper, Wire,
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The name **"GUMMEY"** *burned in the Box means that you are getting*

GUMMEY'S ANTI-PINHOLE BRIGHT TIN PLATES.

THE BEST THE MARKET AFFORDS.

No guesswork about this brand of tin plates; no weak spots. The quality's there—has to be—for they're made from Genuine Charcoal Iron Bars by the good old-fashioned hand method of making charcoal tin plates in use half a century back.

These plates will outwear and give better service than any other plate made. Specially adapted for Roof Gutters, or any work requiring the highest quality of tin.

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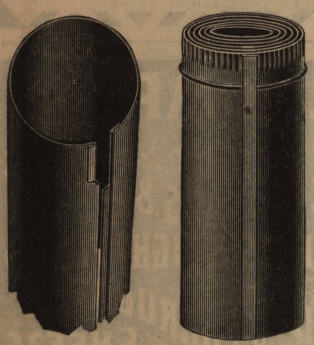

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Black Sheets.
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Conductor Pipe.
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Wire Hangers.
Pressed Brick Siding, etc.

WRITE FOR PRICES AND CATALOGUE "A."

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For nailing on CORRUGATED IRON ROOFING, they will prevent roof from LEAKING or RUSTING through around the nail heads.

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TIN and SHEET IRON WORKERS,

Giving the Rise of the Miter Line of Elbows of any Diameter and Number of Pieces and for any Angle.

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This is an easy and practical system of producing elbow patterns for the use of all light or heavy sheet metal workers. It is simple, accurate and most valuable, being the only *thumb* rule ever produced from which accurate results may be expected. Every good workman has some rule by which he may develop a satisfactory pattern for Elbows at right angles, but when something different is wanted, it is a little trouble. By the use of this chart he can safely depend on getting a correct pattern for any elbow, no matter of what diameter, number of pieces or angle, and mark it out direct on his strip of iron or tin, almost as quick as if he had a pattern. This chart has more combinations and measurements than may be counted, and will be a great help to young or old at the business.

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COSHOCTON, OHIO.

We aim to supply materials to suit the special requirements of our customers. When asking for quotations, please send full specifications regarding quality and finish desired.
This product is made by the

THIRD GENERATION OF SHEET ROLLERS.

MAKERS OF

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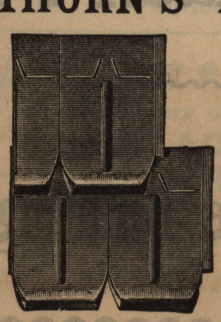

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The Best, Most Handsome, Durable and Secure Roofing Plates Yet Offered to the Building Trade.

Indorsed by All the Leading Architects.

Our system differs from all others in existence. We keep a complete stock of *eight designs of tile and two sizes of shingles.* Our tiles are a marvel of beauty and have the most secure and most practical side-lock ever invented.

Send for illustrated catalogue and circular.

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THE HIGHEST AWARD

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SILVER MEDAL, BLUE RIBBON AND DIPLOMA FOR TIN ROOFING PLATE

WERE GIVEN BY

The National Export Exposition, Philadelphia, December, 1899, to

THE NORRISTOWN TINPLATE CO.,

NORRISTOWN, PA.

RICHARD LEWIS, Manager,

In recognition of the superiority of their Roofing Plates.

The diploma reads:

"The Lewis plates are highly commendable for their smooth,
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This is particularly remarkable from the fact that while other Tinplate Manufacturers presented large and expensive exhibits, our exhibit consisted of only a few sheets of our product.

The claims we have made for our plate manufactured under our special process, and which claims have now been recognized and confirmed in the only Exhibition at which there has been a comprehensive exhibit and competition since the Tinplate Industry was established in the U. S., are:

COATING ABSOLUTELY EVENLY DISTRIBUTED.

(SOMETHING NEVER ACCOMPLISHED BY OLD METHODS.)

Insuring a roof equally good in every part.
Our heaviest coated plate, B, is the best plate in market.
All our grades being evenly coated are superior to any others of corresponding weights of coating, unevenly distributed by old methods.

SHEETS UNIFORM IN THICKNESS AT ALL POINTS.

No thick and thin edges as in all old style plates—they work better, folding and locking regularly, and equally close on all sides, making strong joints with economical use of solder.
Workmen frequently have to cut off wide strips on the heavy drip edge of old style plates to make them fold and lock properly—wasting time and material.

PERFECTLY DEAD-FLAT SMOOTH SURFACE.

(SHOWING AT SIGHT THE PERFECTION OF THE COATING.)

Can be soldered faster with greater certainty of good work than rough, unevenly surfaced plates.

HIGHEST QUALITY BLACK SHEETS ONLY USED.

None but the very highest quality of stock is used in all grades of Norristown New Method plates, and every sheet is guaranteed.

The best quality Palm Oil is used in the manufacture of these plates.

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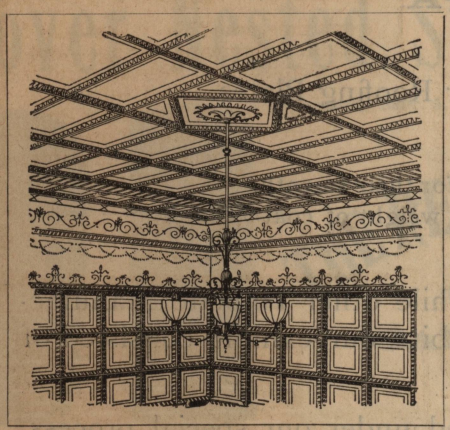

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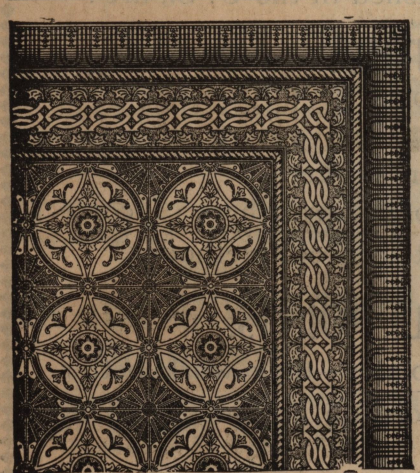

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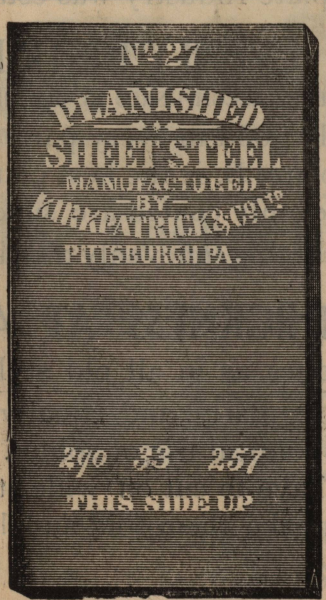

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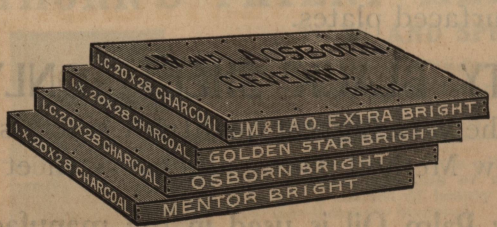

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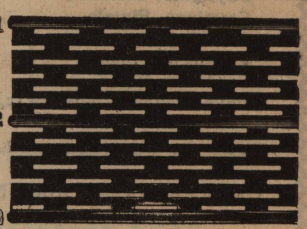

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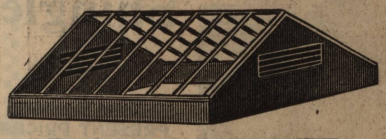

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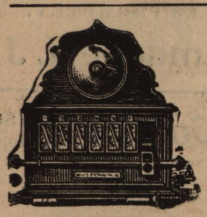

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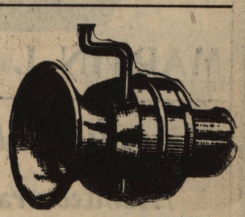

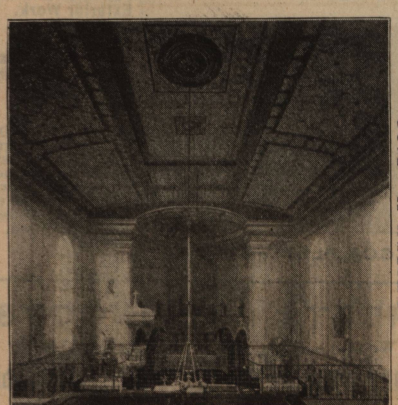

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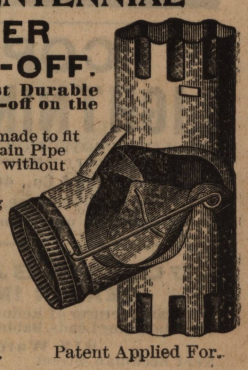

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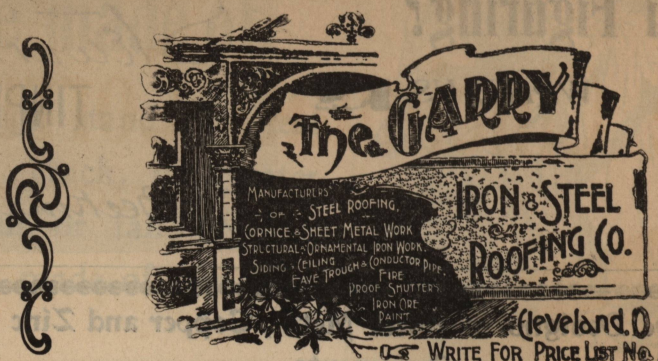

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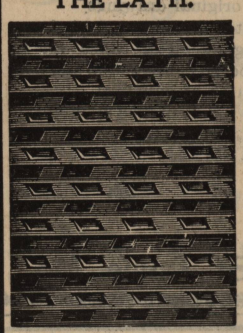

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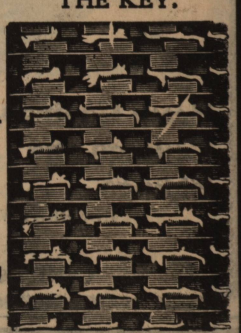

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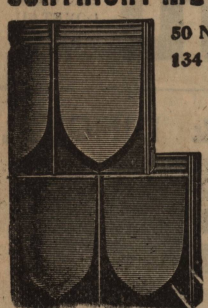

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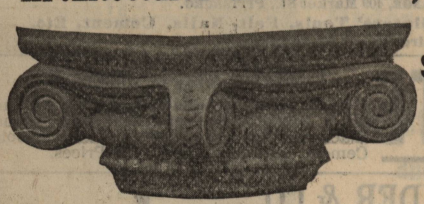

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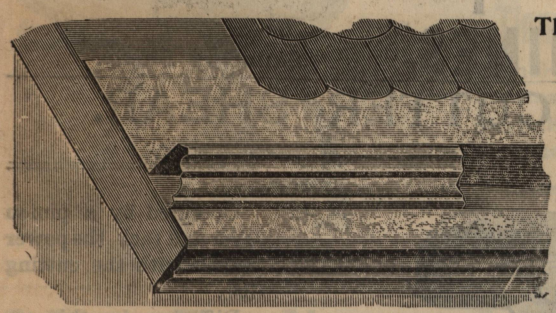

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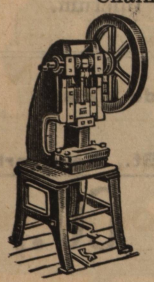

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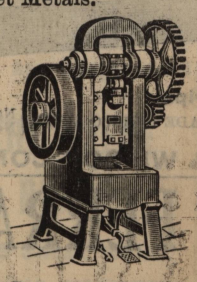

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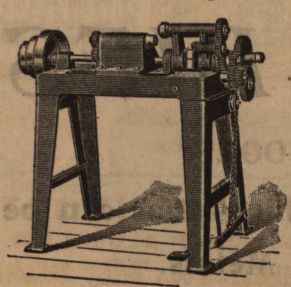

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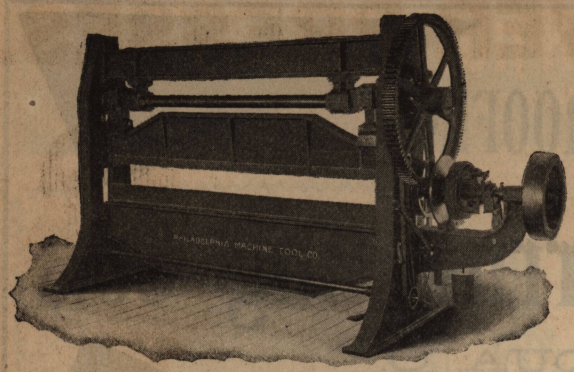

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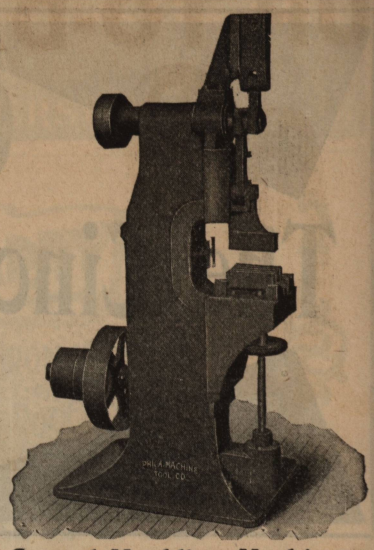

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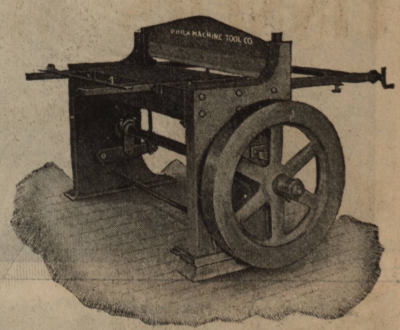

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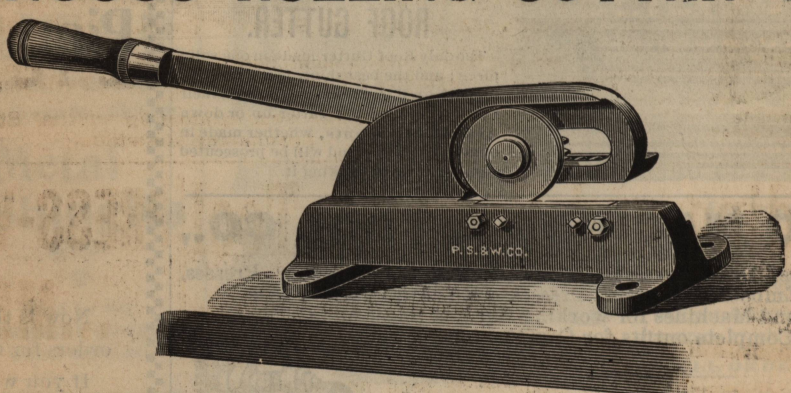

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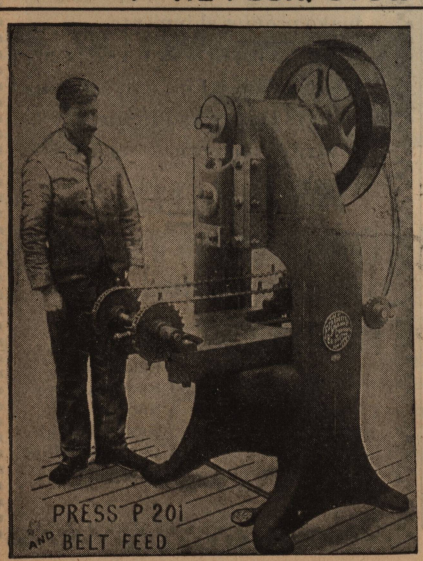

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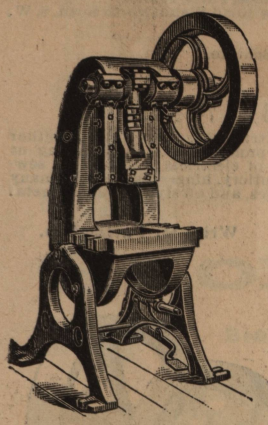

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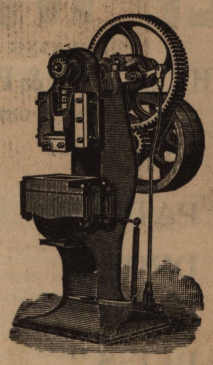

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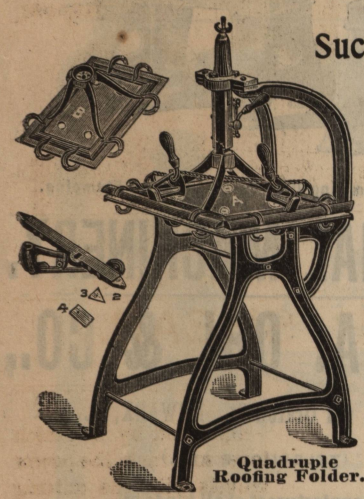

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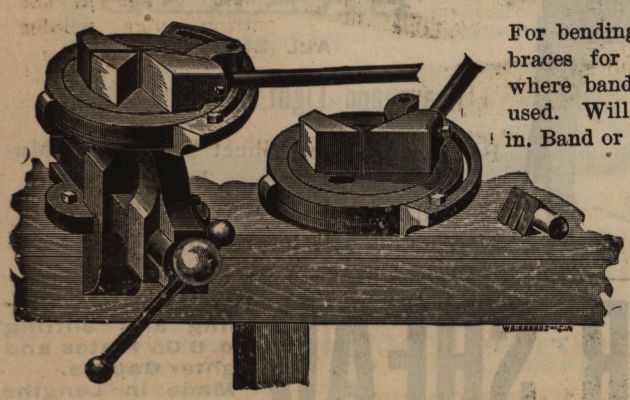

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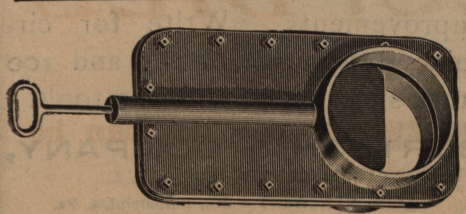

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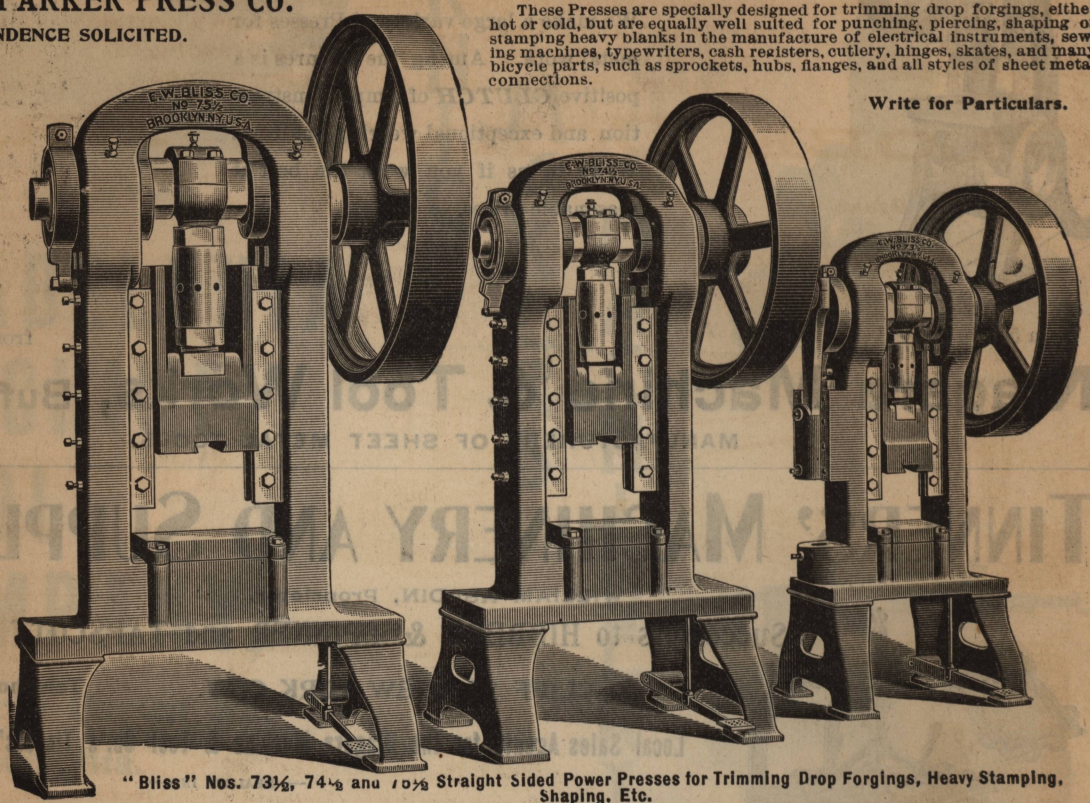

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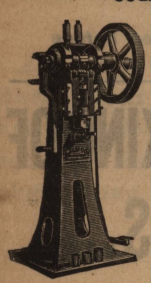

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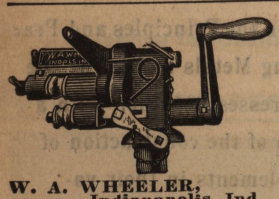

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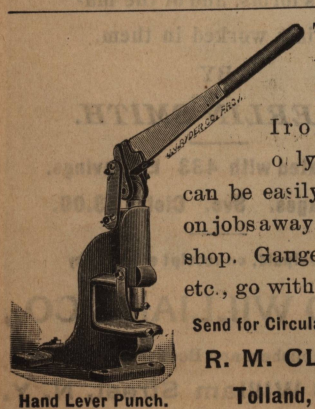

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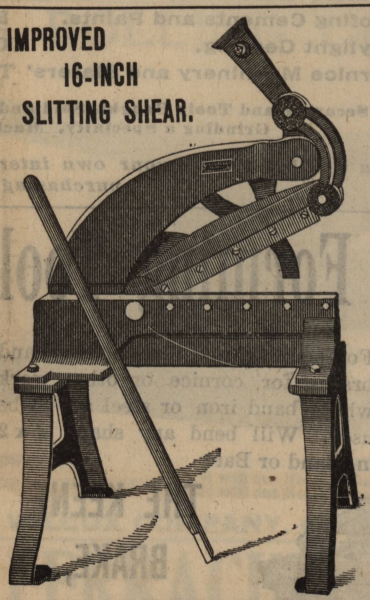

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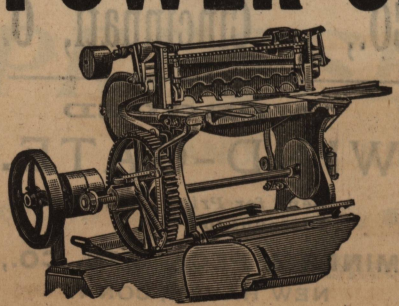

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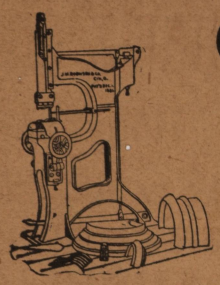

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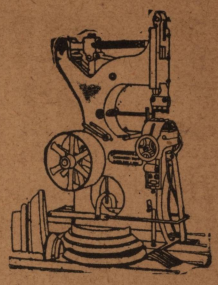

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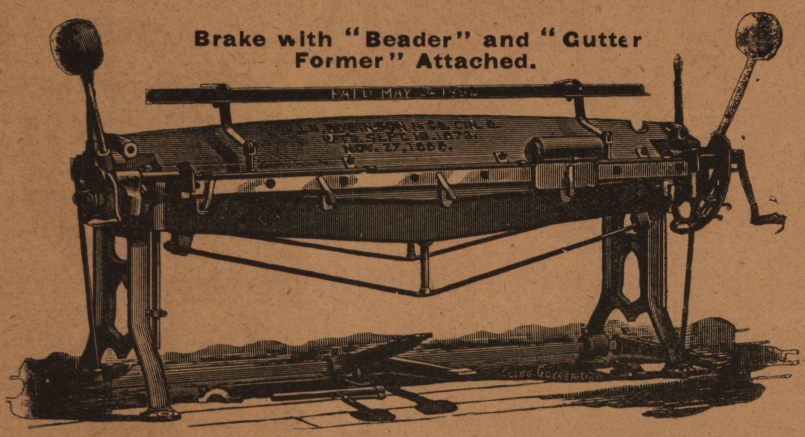

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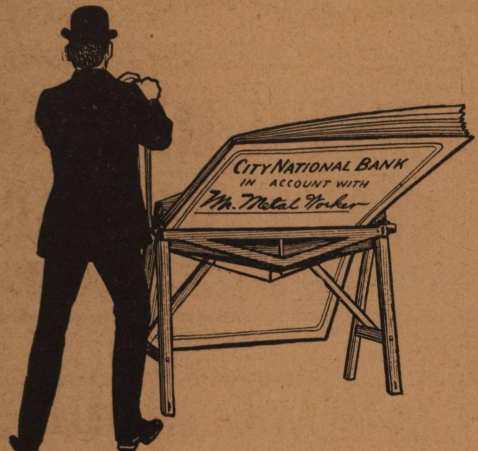

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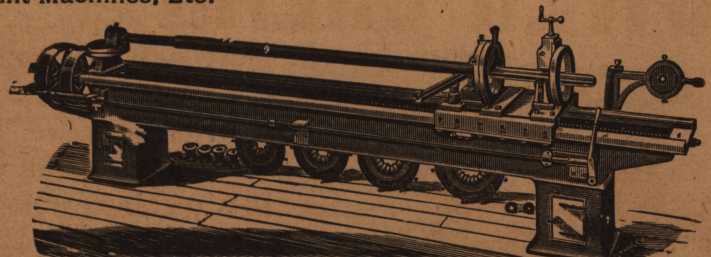

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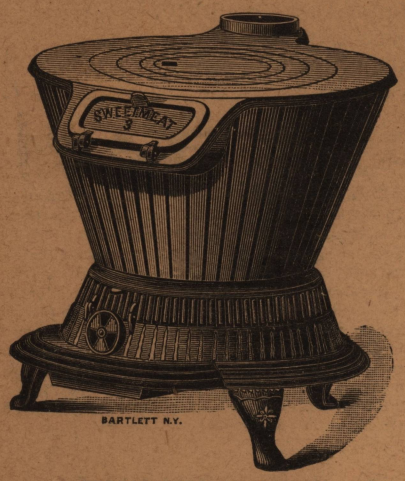

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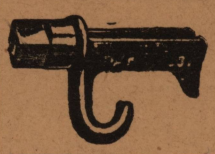

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